



WATER-LEVEL DATA

FOR WELLS IN AND NEAR BURIAL GROUND 4,
OAK RIDGE NATIONAL LABORATORY, TENNESSEE,
1975-1979

By D. A. Webster, J. S. Beatty, P. M. Benjamin, and W. M. Trantum

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ABSTRACT

This report presents data pertaining to wells in the general vicinity of Burial Ground 4 at Oak Ridge National Laboratory, Tennessee, for the period 1975 to 1979. It includes an inventory of wells, measurements of water levels, well hydrographs, and a map showing the location of the wells.

INTRODUCTION

Solid waste materials contaminated by low levels of radioactivity are usually disposed of by shallow trench burial in areas termed "burial grounds". As part of a hydrogeologic investigation of the burial grounds at Oak Ridge National Laboratory (ORNL), personnel of the Geological Survey have made frequent measurements of water levels in wells located in or near these disposal sites. With the completion of this phase of the investigation, the data are being published to serve the needs of the operators and managers of the sites and of the scientists that are performing various studies in them.

This report presents data pertaining to the wells and water-level fluctuations in wells near Burial Ground 4 for the period 1975 through 1979. These data have been collected to document recent hydrologic conditions at that site, to provide a foundation for interpretive reports that are to follow, to offer measured values for numerical models that simulate the ground-water flow system, and ultimately to aid in efforts leading to the design of a network for monitoring the movement of radionuclides from the waste-disposal sites.

The information is presented in four parts. Part 1 (table 1) is a well inventory, giving the location of the wells and certain characteristics about them. Part 2 (table 2) lists the depth to water measurements at each well, by date. Part 3 provides supplemental water-level measurements at wells for which only a very small number of measurements were made, and at wells for which measurements were made on dates other than those reported in the matrix of table 2. Part 4, consisting of hydrographs, illustrates the fluctuations of the water surface in each well during the period of record.

A map (plate 1) showing the location of the wells is included at the end of the report.

Acknowledgments

Collection of the data has been performed in cooperation with the Oak Ridge Operations Office of the United States Department of Energy.

The authors gratefully acknowledge the assistance of D. D. Huff, Environmental Sciences Division, ORNL, and personnel of the Computer Sciences Division, ORNL, who have furnished computer-generated hydrographs of the water-level data. Although the hydrographs contained in this report have been drafted, the computer graphics have been very useful for identifying and correcting anomalies in the data base. The authors also express their appreciation to personnel in the Engineering Division, Union Carbide Corporation-Nuclear Division, for their generous provision of map and survey data pertaining to the wells reported herein. Without this information, the usefulness of the report would be considerably diminished.

References

- Duguid, J. O., 1975, Status report on radioactivity movement from burial grounds in Melton and Bethel Valleys: U.S. Energy Research and Development Admin., Oak Ridge Natl. Lab. (Rept.) ORNL-5017, 66 p.
- Duguid, J. O., 1976, Annual progress report of burial ground studies at Oak Ridge National Laboratory: Period ending September 30, 1975: U.S. Energy Research and Development Admin., Oak Ridge Natl. Lab. (Rept.) ORNL-5141, 56 p.
- Gera, Ferruccio, circa 1964, Status report on evaluation of solid waste disposal at ORNL: 3: U.S. Atomic Energy Comm., Oak Ridge Natl. Lab. (Rept.), unpub. manuscript, 17 p., 16 tables, 10 figs.

PART 1. -WELL INVENTORY

WELL INVENTORY

The following wells of record were destroyed prior to the initial inventory made in April 1975:

Well number	185	198	405
	193	199	409
	194	401	

Well 402 was filled with dirt to within 3.5 ft of land surface when initially inventoried.

Cross-Reference:

The following wells have also been identified by the numbers indicated:

Reference:	Duguid (1975, 1976);	Gera (1964)
	<u>This report</u>	
	Well 186A	403
	190A	408
	190B	406
	190C	405

<u>This report</u>	<u>Duguid (1975, 1976)</u>	<u>This report</u>	<u>Duguid (1975, 1976)</u>
A1	S212/W90	A19	S120/E0
A2	S218/W90	A20	S120/E30
A3	S227/W90	A21	A120/E60
A4	S232/W90	A22	S96/E30
A5	S297.2/W62.2	A23	S90/E40
A6	S300.6/W27.9	A24	S90/E60
A7	S295.7/W7.7	A25	S90/E75
A8	S210/W56	A26	S77/E73
A9	S210/W30	A27	S60/E87
A10	S210/W21	A28	S41/E95
A11	S180/W30	A29	S30/E100
A12	S180/E0	A30	S30/E109
A13	S180/E13	A31	S30/E125
A14	S150/W30	A32	S16.6/E97.8
A15	S150/E0	A33	NO/E95
A16	S150/E30	A34	NO/E106
A17	S150/E60	A35	N30/E90
A18	S120/W30	A36	N30/E105
		A37	N30/E135

Latitude and Longitude Determinations

The latitude and longitude of individual well sites listed in table 1 have been determined by substituting the ORNL grid coordinates (N and E) in the following set of equations:

$$\text{Latitude} = 35^{\circ}49'42.76'' + X$$

$$\text{Longitude} = 84^{\circ}21'41.41'' + Y$$

where $X = (0.00821N + 0.00553E)$, in seconds

$Y = (0.00676N - 0.01003E)$, in seconds

These equations provide a close approximation of latitude and longitude useful for the computer identification of wells. The reader is cautioned that their accuracy for other purposes, or for wells in areas other than the Melton Valley burial grounds, may be limited by errors inherent in the surveys and a small adjustment made herein to the point of beginning of the ORNL Grid Survey. Re-surveys are in progress. For the most precise determination of latitude and longitude, the reader may desire to refer coordinates from the re-surveys to the Tennessee State Plane Survey.

Explanation of Terms

WELL NO. - Well identification number which corresponds to the well number shown on the map following Part 4.

ORNL GRID - Coordinates describing the location of the well, reported in feet north and east from the Point of Beginning of the ORNL Grid Survey.

DEPTH OF WELL - The distance, rounded to the nearest foot, between land surface and the bottom of the well.

YEAR COMPLETED - The year that the well was completed, if known.

CASING DIAMETER - The internal diameter of the casing, expressed in inches.

CASING TYPE - The material of which the casing is made. The following letters denote casing materials:

A - aluminum

P - plastic

S - steel

FINISH - Refers to the character and position of the openings that permit water to enter the well.

CHARACTER is denoted by the following letters:

Prf - perforated casing

Slr - slotted casing

Opn - open borehole

DEPTH INTERVAL lists the depth, in feet below land surface, at which either (a) openings in the casing permit water to enter the well, or (b) the well is not cased. Depths are rounded to the nearest foot. Records for most wells do not exist; consequently, data in this column for wells constructed prior to 1977 are inferred from the type of casing present. A query (?) denotes unknown interval.

ALTITUDE - The altitude of the land surface at the well, in feet above the National Geodetic Vertical Datum (NGVD) of 1929.

MEASURING POINT - Refers to the point at the top of the casing at which repetitive water-level measurements were made.

DISTANCE ABOVE LAND SURFACE - The distance in feet from the measuring point to land surface.

DATE DETERMINED - The date when the measuring point was established.

DEPTH TO WATER BELOW LAND SURFACE - This column summarizes the data extremes that appear in table 2. Dashes appear for those wells at which less than five measurements were made during the period of record; these measurements are listed in Part 3.

MINIMUM - The minimum measured depth to water, in feet below land surface, during the period of record. A plus sign indicates a water level above land surface.

MAXIMUM - The maximum depth to water, in feet below land surface, during the period of record.

STATUS OF WELL 12/79 - The status of the well as determined by field inspection on December 27, 1979. Status is denoted by the following letters:

A - Casing undamaged. Water level is measureable and samples are obtainable.

B - Casing is damaged, but water level is measureable and samples are obtainable. Measuring point distance reported herein and top of casing altitude (not reported herein) may or may not require adjustment.

D - Well has been destroyed.

Table 1.- Data of observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee

Well number	Location		Depth of well (ft)	Year completed	Casing			Altitude of land surface (ft above NGVD)	Measuring Point		Depth to Water below land surface			Status of well 12/79
	Latitude (deg., m, s)	Longitude (deg., m, s)			Diameter (in)	Type	Character		Distance above surface (ft)	Date determined (m/d/yr)	Period of record (yrs)	Minimum (ft)	Maximum (ft)	
112	35 54 52	84 19 25	N19450 E27012	95	5 1/2	S	Opn	?	1.22	4/22/75	1975-79	11.96	19.45	A
179	35 54 47	84 19 21	N18832 E26993	21	6 5/8	S	Prf	0-21	2.45	4/22/75	1975-79	5.38	19.04	A
180	35 54 51	84 19 23	N19220 E27057	18	1959	6 5/8	S	Prf	1.35	4/22/75	1975-79	7.46	15.54	B
181	35 54 49	84 19 21	N19021 E27062	14	1959	6 5/8	S	Prf	0.30	4/22/75	1975-79	2.81	DRY	A
182	35 54 47	84 19 20	N18827 E27038	20	1959	6 5/8	S	Prf	1.90	4/22/75	1975-79	1.44	12.94	A
183	35 54 45	84 19 19	N18612 E26997	15	1959	6 5/8	S	Prf	0.30	4/22/75	1975-79	7.02	14.51	A
184	35 54 55	84 19 19	N19418 E27553	16	1959	6 5/8	S	Prf	0.30	4/22/75	1975-79	1.69	6.32	B
186	35 54 52	84 19 16	N19019 E27549	6	1959	6 5/8	S	Prf	2.60	4/22/75	1975-79	0.14	0.95	A
186A	35 54 52	84 19 17	N19058 E27514	9	1964	6 7/8	S	Prf	1.25	4/22/75	1975-79	0.39	4.60	B
187	35 54 50	84 19 15	N18786 E27544	19	1959	6 5/8	S	Prf	1.94	4/22/75	1975-79	1.89	13.76	A
188	35 54 59	84 19 15	N19602 E28052	19	1959	6 5/8	S	Prf	1.95	4/22/75	1975-79	1.88	14.45	A
189	35 54 58	84 19 14	N19404 E28048	19	1959	6 5/8	S	Prf	1.95	4/22/75	1975-79	2.58	8.16	A
190	35 54 56	84 19 13	N19208 E28047	15	1959	6 5/8	S	Prf	1.90	4/22/75	1975-79	5.42	10.91	A
190A	35 54 56	84 19 10	N19061 E28253	10	1964	6 7/8	S	Prf	2.34	4/22/75	1975-79	1.67	7.81	A
190B	35 54 57	84 19 12	N19243 E28098	12	1964	6 7/8	S	Prf	2.52	4/22/75	1975-79	3.23	9.18	B
190C	35 54 56	84 19 14	N19221 E27919	12	1964	6 7/8	S	Prf	2.00	4/22/75	1975-79	0.59	7.38	A
191	35 54 54	84 19 11	N19008 E28034	7	1959	6 5/8	S	Prf	2.15	4/22/75	1975-79	0.53	2.32	A
192	35 55 01	84 19 09	N19396 E28573	15	1959	6 5/8	S	Prf	1.15	4/22/75	1975-79	1.22	7.98	B
195	35 54 57	84 19 02	N18787 E28789	7	1959	6 5/8	S	Prf	1.83	4/22/75	1975-79	0.40	3.26	A
196	35 54 59	84 19 04	N19059 E28856	11	1959	6 5/8	S	Prf	2.05	4/22/75	1975-79	+0.01	1.16	A
197	35 55 01	84 19 03	N19134 E28970	15	1959	6 5/8	S	Prf	2.15	4/22/75	1975-79	0.69	3.44	A
200	35 55 05	84 19 04	N19565 E29116	11	1977	6 5/8	S	Prf	2.52	7/11/77	1977-79	+0.01	9.38	A
201	35 54 04	84 19 02	N19367 E29183	29	1977	3	Slt	19-29	2.70	7/11/77	1977-79	11.26	13.97	A
202	35 54 59	84 19 07	N19173 E28563	19	1977	6 5/8	S	Prf	3.68	7/11/77	1977-79	0.65	9.07	A
203	35 54 57	84 19 06	N19001 E28572	19	1977	6 5/8	S	Prf	2.92	7/11/77	1977-79	9.42	14.68	A
402	35 54 53	84 19 18	-	3	1964	6 7/8	S	Prf	0.00	4/22/75	1975-76	2.80	DRY	D
404	35 54 54	84 19 16	N19220 E27714	10	1964	6 7/8	S	Prf	1.81	2/16/77	1977-79	0.22	2.37	B
407	35 54 58	84 19 12	N19349 E28279	8	1964	6 7/8	S	Prf	1.02	4/22/75	1975-79	4.51	DRY	B
410	35 54 57	84 19 07	N19066 E28472	17	1964	6 7/8	S	Prf	2.40	4/22/75	1975-79	3.96	11.17	A
A-1	35 54 56	84 19 03	-	4	1974	4 3/8	A	Prf	0.96	4/22/75	-	-	-	A
A-2	35 54 56	84 19 03	-	4	1974	4 3/8	A	Prf	1.05	4/22/75	-	-	-	A
A-3	35 54 56	84 19 03	-	3	1974	3 7/8	A	Prf	1.00	4/22/75	-	-	-	A
A-4	35 54 56	84 19 03	-	3	1974	4 3/8	A	Prf	1.93	4/22/75	-	-	-	A
A-5	35 54 54	84 19 01	-	6	1974	3 5/8	A	Prf	2.10	4/22/75	-	-	-	A
A-6	35 54 55	84 18 59	-	5	1974	3 5/8	A	Prf	2.05	4/22/75	-	-	-	A

Table 1.-Data of observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee.-- Continued

Well number	Location			Depth of well (ft)	Year completed	Casing			Altitude of land surface (ft above NGVD)	Measuring Point		Depth to Water below land surface			Status of well 12/79
	Latitude (deg., m, s)	Longitude (deg., m, s)	ORNL Grid (ft) (ft)			Diameter (in)	Type	Char-acter interval		Distance above land surface (ft)	Date determined (m/d/yr)	Period of record (yrs)	Minimum (ft)	Maximum (ft)	
A-7	35 54 55	84 18 59	-	6	1974	3 5/8	A	Prf 1-6	-	2.34	4/22/75	-	-	-	A
A-8	35 54 57	84 19 02	-	3	1974	3 1/4	A	Prf 1-3	-	1.77	4/22/75	-	-	-	A
A-9	35 54 58	84 19 01	-	3	1974	3 1/4	A	Prf 1-3	-	1.30	4/22/75	-	-	-	A
A-10	35 54 58	84 19 01	-	4	1974	3 5/8	A	Prf 1-4	-	1.60	4/22/75	-	-	-	A
A-11	35 54 58	84 19 02	NI8910 E28901	3	1974	3 1/4	A	Prf 1-3	761.50	1.05	4/22/75	1975-79	+0.10	2.50	A
A-12	35 54 59	84 19 01	-	5	1974	3 1/4	A	Prf 1-5	-	2.65	4/22/75	-	-	-	A
A-13	35 54 59	84 19 01	-	5	1974	3 1/4	A	Prf 1-5	-	2.43	4/22/75	-	-	-	A
A-14	35 54 59	84 19 03	-	2	1974	3 1/4	A	Prf 1-2	-	1.20	4/22/75	-	-	-	A
A-15	35 55 00	84 19 02	-	5	1974	3 1/4	A	Prf 1-5	-	2.00	4/22/75	-	-	-	A
A-16	35 55 00	84 19 01	-	4	1974	3 1/4	A	Prf 1-4	-	3.23	4/22/75	-	-	-	A
A-17	35 55 01	84 19 00	-	9	1974	3 5/8	A	Prf 1-9	-	1.25	4/22/75	-	-	-	A
A-18	35 55 00	84 19 03	-	5	1974	3 5/8	A	Prf 1-5	-	1.30	4/22/75	-	-	-	A
A-19	35 55 01	84 19 02	-	3	1974	3 5/8	A	Prf 1-3	-	2.50	4/22/75	-	-	-	A
A-20	35 55 01	84 19 01	-	4	1974	3 5/8	A	Prf 1-4	-	0.90	4/22/75	-	-	-	A
A-21	35 55 02	84 19 00	-	4	1974	3 5/8	A	Prf 1-4	-	2.30	4/22/75	-	-	-	A
A-22	35 55 02	84 19 02	-	5	1974	3 5/8	A	Prf 1-5	-	0.40	4/22/75	-	-	-	A
A-23	35 55 02	84 19 02	-	4	1974	3 5/8	A	Prf 1-4	-	0.50	4/22/75	-	-	-	A
A-24	35 55 02	84 19 01	NI9205 E29198	5	1974	3 5/8	A	Prf 1-5	763.90	2.70	4/22/75	1975-79	1.26	DRY	A
A-25	35 55 03	84 19 01	-	3	1974	3 5/8	A	Prf 1-3	-	1.85	4/22/75	-	-	-	A
A-26	35 55 03	84 19 01	-	3	1974	3 5/8	A	Prf 1-3	-	0.90	4/22/75	-	-	-	A
A-27	35 55 04	84 19 01	-	4	1974	3 5/8	A	Prf 1-4	-	1.00	4/22/75	-	-	-	A
A-28	35 55 04	84 19 01	-	3	1974	4 3/8	A	Prf 1-3	-	0.75	4/22/75	-	-	-	A
A-29	35 55 05	84 19 01	-	4	1974	4 3/8	A	Prf 1-4	-	0.65	4/22/75	-	-	-	A
A-30	35 55 05	84 19 01	-	3	1974	3 5/8	A	Prf 1-3	-	1.10	4/22/75	-	-	-	A
A-31	35 55 05	84 19 00	-	5	1974	3 7/8	A	Prf 1-5	-	2.40	4/22/75	-	-	-	A
A-32	35 55 05	84 19 01	-	4	1974	4 3/8	A	Prf 1-4	-	0.65	4/22/75	-	-	-	A
A-33	35 55 06	84 19 02	-	4	1974	3 5/8	A	Prf 1-4	-	1.15	4/22/75	-	-	-	A
A-34	35 55 06	84 19 01	-	4	1974	3 5/8	A	Prf 1-4	-	1.30	4/22/75	-	-	-	A
A-35	35 55 06	84 09 03	NI9598 E29296	3	1974	3 5/8	A	Prf 1-3	767.55	2.35	4/22/75	1975-79	0.01	1.98	A
A-36	35 55 07	84 19 02	-	3	1974	3 5/8	A	Prf 1-3	-	2.10	4/22/75	-	-	-	A
A-37	35 55 07	84 19 01	-	5	1974	3 5/8	A	Prf 1-5	-	1.57	4/22/75	-	-	-	A

PART 2. -- WATER-LEVEL DATA

Table 2. -- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement													
	4/22/75	10/22/75	12/08/75	1/09/76	2/26/76	4/06/76	6/11/76	7/12/76	8/24/76	10/01/76	10/28/76	12/01/76	12/01/76	12/01/76
112	14.31	15.60	15.39	13.74	13.62	13.55	14.96	14.97	16.68	15.28	16.23	15.66		
179	13.87	12.15	14.58	10.04	10.49	10.17	13.31	13.74	15.71	16.48	14.22	13.17		
180	12.35	11.25	12.31	9.85	10.28	11.22	12.51	11.51	14.40	11.49	5.80	9.84		
181	10.29	10.26	10.37	7.02	7.20	7.93	10.83	11.13	DRY	DRY	10.20	10.73		
182	9.59	7.17	9.93	6.31	6.26	7.93	9.14	8.35	11.64	9.34	6.31	5.49		
183	13.33	13.01	13.81	12.50	12.85	13.24	14.04	13.72	14.48	-	10.98	11.83		
184	3.57	3.77	3.83	3.64	3.46	3.53	3.65	3.23	5.95	4.09	3.34	3.42		
185	0.34	0.25	0.23	0.20	0.23	0.25	0.35	0.35	0.70	0.23	0.25	0.25		
186A	3.12	3.00	0.57	0.60	0.81	0.89	3.61	3.48	4.19	4.08	3.37	3.05		
187	8.34	8.12	11.78	5.03	5.79	7.42	9.41	9.35	12.70	13.70	7.27	6.05		
188	4.47	7.06	7.43	3.50	4.05	4.20	7.08	7.23	11.51	13.85	8.52	5.45		
189	4.06	4.94	4.63	3.92	4.05	4.56	6.93	6.70	7.84	6.16	4.52	4.09		
190	9.23	8.95	9.82	8.69	8.81	9.04	9.53	9.61	10.35	10.28	9.71	9.76		
190A	3.63	5.18	6.03	4.65	5.04	5.74	6.44	6.13	7.49	7.29	6.49	5.53		
190B	7.20	6.89	7.21	5.64	6.05	7.02	7.82	7.70	8.82	8.60	5.99	6.95		
190C	3.37	2.03	3.10	2.24	2.56	2.90	3.18	3.22	4.78	5.14	3.43	3.24		
191	1.05	1.23	1.49	1.12	1.26	1.30	1.81	1.51	2.18	1.00	1.21	1.24		
192	-	3.15	4.13	2.54	2.25	2.37	3.78	3.42	6.67	6.55	3.02	3.16		
195	1.01	1.07	1.12	0.64	0.66	1.28	2.12	1.82	3.26	1.62	1.23	1.10		
196	0.37	0.28	0.54	0.17	0.18	-	0.60	0.39	0.85	0.62	0.25	0.21		
197	1.83	1.58	1.53	1.67	1.44	2.15	2.15	1.89	3.10	1.70	1.76	1.60		
200	-	-	-	-	-	-	-	-	-	-	-	-		
201	-	-	-	-	-	-	-	-	-	-	-	-		
202	-	-	-	-	-	-	-	-	-	-	-	-		
203	-	-	-	-	-	-	-	-	-	-	-	-		
402	DRY	2.80	DRY	2.80	-	DRY	DRY	DRY	-	-	-	-		
404	-	-	-	-	-	-	-	-	-	-	-	-		
407	5.94	5.92	6.85	5.85	6.00	6.10	6.35	6.13	DRY	DRY	6.77	6.74		
410	9.48	8.96	9.10	7.87	8.87	9.33	9.90	8.83	10.72	9.16	9.48	9.16		
A-11	+0.10	0.08	0.03	+0.01	+0.01	0.39	0.29	+0.02	2.13	0.08	0.01	0.00		
A-24	1.38	1.60	1.58	1.41	1.47	1.61	2.06	1.85	3.06	1.76	1.57	1.50		
A-35	0.17	0.48	0.59	0.29	0.38	0.58	0.80	0.61	1.06	0.25	0.36	0.21		

Table 2. -- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee-- Continued
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement											
	12/17/76	1/06/77	1/27/77	2/16/77	3/02/77	3/15/77	4/01/77	4/12/77	4/26/77	5/13/77	5/24/77	6/06/77
112	13.95	13.96	15.34	14.78	13.93	12.98	13.38	13.20	14.47	14.80	15.43	15.92
179	10.63	11.84	15.55	15.00	10.85	5.51	7.29	8.55	13.53	13.75	14.84	15.56
130	9.02	10.26	13.76	11.90	8.93	7.90	7.81	10.12	11.54	10.43	12.98	13.68
181	7.58	8.10	9.77	11.68	10.00	5.65	6.27	6.81	9.55	10.65	12.29	13.65
182	4.85	6.15	3.99	9.16	5.98	4.34	3.89	6.88	9.86	8.69	10.66	11.39
183	12.35	13.56	14.34	14.51	12.64	9.81	9.94	11.85	12.23	12.63	12.89	13.52
184	3.30	3.44	3.21	4.05	3.28	2.90	2.76	3.52	3.67	3.65	3.87	4.94
185	0.21	0.20	0.15	0.25	0.24	0.21	0.23	0.25	0.25	0.33	0.38	0.83
186A	0.74	0.53	0.39	2.80	2.20	0.60	0.82	1.03	1.13	3.68	3.87	4.13
187	5.54	6.11	7.91	9.55	4.76	4.55	4.14	6.92	9.10	9.89	10.68	11.42
188	3.62	3.98	5.24	6.14	3.84	3.42	3.23	4.41	6.14	7.04	8.26	9.44
189	4.26	4.13	3.93	4.55	4.13	4.03	4.02	4.66	6.47	7.08	6.43	7.75
190	9.00	9.23	9.41	9.81	9.42	8.33	8.75	8.47	9.30	9.70	9.87	10.04
190A	5.01	6.23	5.18	5.75	4.93	3.70	4.61	4.76	5.61	6.08	6.42	6.91
190B	5.33	6.17	6.95	5.29	5.13	4.74	4.55	5.88	7.49	7.98	8.42	8.71
190C	2.13	2.53	2.84	3.65	2.71	1.76	2.46	2.59	3.67	4.20	4.45	4.72
191	1.05	1.13	0.98	1.29	0.94	0.91	1.02	1.07	1.30	1.51	1.67	2.08
192	2.27	2.34	3.03	4.11	2.28	1.96	1.81	2.30	3.79	4.44	5.45	6.15
195	1.04	1.04	1.00	1.23	0.46	0.48	0.57	0.86	1.55	1.94	1.82	2.81
195	0.21	0.26	+0.01	0.38	0.29	0.12	0.15	0.19	0.41	0.53	0.57	0.97
197	1.33	1.29	1.21	1.47	1.49	1.34	1.39	1.55	1.66	2.10	1.89	2.69
200	-	-	-	-	-	-	-	-	-	-	-	-
201	-	-	-	-	-	-	-	-	-	-	-	-
202	-	-	-	-	-	-	-	-	-	-	-	-
203	-	-	-	-	-	-	-	-	-	-	-	-
402	-	-	-	-	-	-	-	-	-	-	-	-
404	-	-	-	0.99	0.68	0.60	0.61	0.84	1.32	1.36	1.55	2.01
407	6.23	6.58	6.84	7.35	6.63	5.44	5.71	5.92	6.53	6.72	7.03	7.36
410	8.62	6.99	9.25	10.13	9.31	8.17	8.45	8.07	9.55	10.10	10.35	10.54
A-11	0.00	0.01	+0.07	+0.02	0.10	0.03	0.06	0.08	0.11	0.23	0.09	2.03
A-24	1.53	1.52	1.43	1.59	1.45	1.39	1.39	1.72	1.93	2.13	2.03	3.13
A-35	0.22	0.18	0.18	0.44	0.24	0.15	0.03	0.40	0.55	0.65	0.61	0.97

Table 2. -- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee-- Continued
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement													
	6/22/77	7/11/77	7/27/77	8/08/77	8/18/77	8/29/77	9/21/77	10/05/77	10/17/77	11/01/77	11/23/77	12/06/77		
112	16.33	16.13	17.89	18.23	18.20	19.45	17.52	17.19	16.65	16.28	13.65	13.80		
179	16.16	14.39	17.99	18.53	18.31	19.04	15.86	15.08	14.31	13.26	6.03	8.39		
180	12.24	12.48	14.75	15.41	14.61	14.94	10.15	12.48	12.35	11.86	7.46	8.86		
181	-	12.77	14.93	DRY	DRY	DRY	10.94	9.64	9.01	9.03	2.81	4.49		
182	11.65	10.12	10.54	11.74	10.62	11.96	4.60	8.59	8.66	8.11	2.15	2.94		
183	13.05	13.49	13.15	13.64	12.49	13.32	10.06	13.16	13.05	11.92	7.02	9.14		
184	5.14	5.10	5.80	6.25	5.23	6.32	3.55	3.78	3.69	3.58	1.69	2.49		
186	0.50	0.65	0.44	0.84	0.40	0.95	0.20	0.24	0.20	0.16	0.14	0.19		
186A	4.28	4.01	4.22	4.39	4.42	4.60	2.94	3.76	0.61	0.58	0.39	0.50		
187	12.34	10.83	12.50	13.29	13.76	14.20	9.12	9.63	9.09	8.10	2.53	3.33		
188	10.88	10.54	12.16	13.11	13.80	14.45	12.10	10.63	9.35	7.73	2.18	2.90		
189	6.56	7.50	6.53	8.16	5.65	7.74	4.63	7.05	6.83	5.97	2.73	4.03		
190	10.22	9.87	10.11	10.29	10.38	10.51	9.68	9.57	9.38	9.29	7.16	7.41		
190A	7.23	7.81	7.53	7.60	7.65	7.91	5.48	6.16	5.94	5.70	1.67	2.87		
190B	8.90	8.13	8.78	9.01	9.09	9.14	6.08	7.36	7.25	7.22	3.74	3.98		
190C	5.03	4.06	4.56	4.85	5.05	5.25	4.07	3.01	2.59	2.52	0.59	1.39		
191	1.92	1.82	1.88	2.19	1.93	2.32	1.33	1.35	1.27	1.31	0.82	0.67		
192	6.56	5.35	6.21	6.83	6.45	7.25	2.82	3.67	3.44	2.87	1.25	1.59		
195	2.05	2.66	2.70	3.24	2.37	2.61	1.24	1.57	1.37	1.21	0.40	0.57		
196	0.74	0.90	0.68	0.98	0.69	1.16	0.56	0.44	0.40	0.45	0.05	0.08		
197	2.28	2.63	2.63	3.15	1.57	3.44	1.57	1.95	1.53	1.48	1.23	1.28		
200	-	8.18	8.43	9.26	8.23	9.38	6.52	7.43	7.21	6.95	4.46	5.01		
201	-	-	13.31	13.67	13.44	13.80	12.70	13.97	12.69	12.46	11.26	11.57		
202	-	-	8.26	8.54	8.67	8.97	6.14	6.47	5.96	5.79	0.65	1.66		
203	-	-	14.38	14.48	14.57	14.68	14.61	14.21	13.41	12.98	10.62	9.78		
402	-	-	-	-	-	-	-	-	-	-	-	-		
404	2.24	1.55	2.04	2.37	2.13	1.85	1.03	1.04	1.03	0.96	0.29	0.28		
407	DRY	7.59	DRY	DRY	DRY	DRY	7.00	7.16	6.83	6.69	4.59	4.88		
410	10.79	10.39	10.70	10.87	11.00	10.85	9.02	9.89	9.53	9.40	4.06	5.59		
A-11	0.33	2.25	1.03	2.50	0.40	2.13	0.13	0.17	0.12	0.10	0.08	0.07		
A-24	1.95	3.65	3.92	DRY	DRY	DRY	1.48	1.83	1.77	1.74	1.43	1.51		
A-35	0.37	0.79	0.47	1.13	0.39	1.98	0.35	0.34	0.45	0.53	0.01	0.04		

Table 2. -- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee-- Continued
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement											
	12/21/77	1/05/78	1/31/78	2/15/78	3/07/78	3/21/78	4/04/78	4/17/78	5/02/78	5/17/78	6/01/78	6/14/78
112	13.63	-	12.66	13.79	11.96	12.87	13.86	14.18	13.91	13.05	14.56	14.21
179	10.99	10.67	7.42	12.45	10.73	8.49	12.17	13.98	13.29	8.26	12.72	9.09
180	10.00	10.85	9.74	10.34	9.07	9.58	11.55	10.84	8.93	8.88	12.23	9.83
181	7.32	7.95	6.11	8.90	8.08	7.07	8.89	11.07	10.10	7.30	10.09	8.58
182	7.13	8.12	6.20	7.43	6.08	6.79	9.13	6.75	8.62	5.80	9.61	5.66
183	11.72	11.32	9.62	12.29	11.60	10.01	11.70	10.80	10.11	9.46	11.90	9.83
184	3.23	3.59	3.77	3.78	3.54	3.83	4.04	3.03	3.15	3.09	3.72	3.30
186	0.23	0.24	0.25	0.26	0.27	0.25	0.29	0.31	0.30	0.27	0.41	0.37
186A	0.53	0.50	0.46	0.49	0.48	0.50	0.66	2.05	2.91	0.69	3.55	0.92
187	4.60	6.43	4.74	5.20	4.66	5.63	7.75	7.92	8.04	5.78	8.95	7.15
188	3.83	4.37	3.68	4.42	3.64	3.97	4.90	3.10	4.13	3.67	6.16	4.70
189	4.55	4.65	4.18	4.04	4.11	4.33	5.56	3.81	4.46	4.49	7.08	5.42
190	8.93	8.89	8.22	9.14	8.99	8.39	9.02	9.42	9.46	8.66	9.21	8.92
190A	5.08	5.21	4.45	4.99	4.84	4.79	5.57	5.26	5.51	4.83	4.91	5.29
190B	4.73	4.71	4.32	4.58	4.94	4.68	6.02	7.07	7.00	5.18	7.07	5.81
190C	2.54	2.67	2.59	3.52	2.89	2.78	3.52	3.99	3.67	2.64	3.66	2.99
191	0.93	0.80	0.53	0.69	0.68	0.73	1.04	0.91	1.08	0.75	1.43	1.16
192	2.23	2.49	2.32	2.58	2.12	2.21	2.60	2.78	2.07	1.87	3.76	2.61
195	1.10	1.24	0.98	1.11	0.99	1.15	1.48	0.97	1.39	1.33	2.11	1.61
196	0.20	0.19	0.12	0.17	0.12	0.11	0.20	0.24	0.39	0.24	0.46	0.29
197	1.34	1.30	1.20	1.28	1.32	1.29	1.55	1.25	1.33	1.25	1.64	1.41
200	6.06	6.33	5.67	5.02	5.81	-	6.40	6.02	6.12	5.56	6.44	5.95
201	11.92	11.94	11.69	12.20	11.97	11.74	12.14	11.95	12.38	11.98	12.50	12.33
202	5.03	5.50	4.31	5.44	5.16	4.72	6.46	7.24	6.74	4.60	6.92	5.32
203	10.98	11.37	10.22	11.72	12.68	11.00	12.12	12.76	13.28	12.20	12.78	12.31
402	-	-	-	-	-	-	-	-	-	-	-	-
404	0.51	0.56	0.23	-	-	-	-	-	-	-	-	-
407	6.32	6.49	6.10	6.60	6.32	6.10	6.58	6.28	6.16	5.31	6.24	5.88
410	8.49	9.03	7.81	8.03	9.20	8.70	9.65	8.40	9.02	8.72	9.73	8.95
A-11	0.08	0.06	0.05	0.03	0.08	0.03	0.30	0.07	0.08	0.05	0.08	0.05
A-24	1.67	1.70	1.67	1.65	1.65	1.71	1.77	1.67	1.75	1.68	2.10	1.94
A-35	0.30	0.34	0.23	0.26	0.19	0.32	0.48	0.01	0.25	0.16	0.60	0.33

Table 2. -- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee-- Continued
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement											
	6/29/78	7/12/78	7/26/78	8/11/78	8/22/78	9/07/78	9/19/78	10/06/78	10/17/78	11/01/78	11/15/78	11/28/78
112	14.98	15.95	15.84	15.21	14.46	15.49	15.90	16.38	16.72	16.98	17.11	16.37
179	13.47	15.04	14.80	13.43	11.73	13.70	14.57	15.75	16.13	16.78	17.19	15.97
180	12.33	13.78	10.85	9.15	11.49	13.51	13.72	13.95	14.65	15.27	15.54	9.91
181	11.35	13.07	12.90	10.25	8.45	11.17	12.57	14.33	DRY	DRY	DRY	13.88
182	9.68	11.07	4.84	5.49	7.32	9.65	10.01	11.04	12.02	12.56	12.94	6.47
183	12.10	13.00	9.86	9.19	10.18	11.88	11.79	12.71	13.31	13.85	14.02	9.53
184	4.02	4.83	3.65	3.12	3.58	4.10	4.15	4.48	5.00	5.25	4.84	3.71
186	0.46	0.43	0.32	0.24	0.31	0.37	0.37	0.44	0.62	0.76	0.70	0.27
186A	3.55	3.58	2.60	2.30	3.17	3.36	3.51	3.77	3.97	4.24	4.43	2.91
187	9.99	11.01	10.36	8.26	8.24	10.37	10.91	11.90	12.46	13.18	13.72	12.08
188	7.01	8.88	9.32	7.89	6.29	8.21	9.58	11.02	11.91	12.98	13.94	13.09
189	7.17	7.25	4.83	4.80	6.78	7.06	7.10	7.13	7.57	8.14	7.82	4.68
190	9.40	9.86	9.86	9.68	9.27	9.79	10.09	10.42	10.58	10.77	10.91	10.49
190A	6.22	6.75	6.06	5.34	5.64	6.29	6.52	6.90	7.14	7.30	7.41	5.89
190B	7.63	8.27	7.14	5.85	6.25	7.73	8.18	8.70	8.85	9.04	9.18	7.21
190C	4.03	4.61	4.49	3.68	2.63	3.82	4.41	6.84	6.97	7.21	7.38	7.05
191	1.61	1.78	1.37	1.18	1.29	1.62	-	1.80	1.92	1.97	1.97	1.62
192	4.73	5.74	3.95	2.50	3.30	4.99	5.58	6.49	6.99	7.58	7.98	4.24
195	2.57	2.82	1.45	1.25	1.75	2.07	1.87	1.84	1.93	1.80	1.59	1.33
196	0.30	0.59	0.27	0.16	0.17	0.50	0.62	0.72	0.77	0.79	0.68	0.37
197	2.08	2.25	1.35	1.30	1.52	2.04	2.15	2.02	2.31	2.33	2.25	1.73
200	6.68	7.27	6.11	5.71	6.13	6.79	6.92	7.40	8.06	8.76	8.26	5.31
201	12.87	13.21	12.57	12.22	12.41	13.00	13.08	-	-	-	-	-
202	7.22	7.82	7.27	4.95	5.43	7.22	7.88	8.29	8.64	8.90	9.07	7.44
203	12.76	13.28	13.31	13.04	11.35	12.33	12.99	13.58	13.83	14.15	14.41	14.16
402	-	-	-	-	-	-	-	-	-	-	-	-
404	-	1.39	0.92	0.76	0.94	1.17	1.19	1.32	1.45	1.59	1.57	0.68
407	6.33	7.33	6.42	6.02	5.89	6.43	6.99	7.73	DRY	DRY	DRY	7.17
410	9.87	10.22	8.79	8.88	9.09	9.93	10.25	10.58	10.74	10.99	11.17	8.15
A-11	0.54	0.59	0.13	0.07	0.07	0.11	0.07	0.07	0.07	0.07	0.05	0.04
A-24	3.20	4.05	1.99	1.76	2.11	2.60	2.49	3.30	3.09	3.14	2.06	1.70
A-35	0.60	0.74	0.08	0.04	0.23	0.51	0.49	0.58	0.94	1.05	0.87	0.22

Table 2. --- Depth to water, in feet below land surface, in observation wells in and near Burial Ground 4, Oak Ridge National Laboratory, Roane County, Tennessee-- Continued
(Plus sign preceding measurement indicates water level above land surface.)

Well No.	Dates of measurement												
	12/20/78	12/22/78	1/12/79	1/31/79	2/21/79	3/07/79	3/22/79	4/10/79	5/01/79	5/18/79	6/06/79	6/20/79	7/17/79
112	14.55	14.20	13.22	13.28	13.07	12.44	13.32	12.96	14.06	14.73	12.54	14.75	14.56
179	11.81	10.40	7.08	8.43	10.11	5.38	10.51	9.12	12.04	13.83	5.72	12.30	12.52
180	10.06	8.29	9.08	8.42	7.96	7.96	10.25	8.74	10.99	12.23	8.39	12.61	8.11
181	7.47	6.23	5.17	5.98	6.98	4.06	7.72	7.45	9.06	11.12	5.19	9.44	9.13
182	7.33	3.31	5.33	5.66	1.44	4.06	7.20	3.03	6.80	9.45	3.93	9.02	3.79
183	10.89	9.29	9.04	9.48	10.50	8.20	10.32	-	-	-	8.47	11.30	8.39
184	3.32	2.97	3.51	3.56	2.59	3.18	3.86	3.07	3.68	3.81	2.79	3.78	2.93
186	0.20	0.15	0.24	-	0.15	0.24	0.26	0.26	0.29	0.41	0.35	0.44	0.32
186A	0.89	0.80	0.75	1.61	0.56	0.96	1.54	2.36	3.68	3.83	2.81	3.74	2.45
187	8.09	3.67	4.53	4.64	1.89	3.80	5.94	3.44	7.94	9.13	4.77	9.10	5.21
188	4.77	3.20	3.39	3.69	1.88	3.30	4.34	3.10	4.93	5.81	3.43	6.02	4.24
189	4.38	4.17	4.52	4.42	2.58	4.14	4.78	4.16	5.67	7.05	4.41	6.91	4.43
190	9.33	8.90	8.42	8.68	8.88	7.76	9.06	9.03	9.21	9.58	7.98	9.03	9.07
190A	4.95	3.02	3.72	4.29	3.61	3.20	5.24	4.79	5.40	5.85	3.72	5.78	4.85
190B	5.56	4.20	4.42	4.43	3.23	4.14	5.91	4.94	6.99	7.70	4.57	7.06	4.39
190C	4.33	3.70	3.93	4.22	4.25	3.78	4.78	4.52	5.20	5.71	3.55	5.23	7.37
191	0.92	0.87	0.87	0.93	0.77	0.90	1.11	1.08	1.24	1.68	0.99	1.66	1.43
192	2.47	1.87	2.14	2.28	1.22	1.94	2.66	1.75	3.03	4.03	1.91	4.13	2.31
195	-	0.94	1.23	1.29	0.47	1.03	1.46	1.15	1.65	2.02	1.03	2.19	1.02
196	-	0.12	0.10	0.13	0.00	0.10	0.15	0.08	0.18	0.36	1.12	0.53	0.17
197	-	1.26	1.18	1.22	1.09	1.22	1.43	1.40	1.45	1.66	0.69	1.52	1.28
200	4.54	5.30	5.47	5.52	+0.01	5.09	5.42	2.36	6.09	6.41	4.96	6.11	4.75
201	-	-	-	-	-	-	-	-	-	-	-	-	-
202	5.03	3.99	3.30	4.06	3.52	2.62	5.33	4.75	6.58	7.49	3.18	6.32	5.13
203	-	11.43	9.84	10.27	9.89	9.42	11.11	11.48	11.72	12.94	9.83	11.08	12.06
402	-	-	-	-	-	-	-	-	-	-	-	-	-
404	0.59	0.55	0.59	0.57	0.22	0.42	0.77	0.51	1.02	1.10	0.55	1.14	0.63
407	6.36	5.49	5.53	5.91	5.62	5.04	6.18	5.66	6.22	6.36	4.51	6.03	5.36
410	7.37	7.39	7.30	7.81	3.96	6.83	9.16	8.36	9.55	10.06	7.22	9.36	8.54
A-11	-	0.04	0.01	0.03	+0.02	0.04	0.05	0.02	0.01	0.02	0.00	0.16	0.05
A-24	-	1.67	1.75	1.76	1.26	1.70	1.89	1.49	1.94	2.26	1.28	1.67	1.77
A-35	-	1.32	1.24	1.26	1.16	1.23	1.30	1.28	1.17	1.19	1.17	1.29	1.22

PART 3. -- SUPPLEMENTAL WATER-LEVEL MEASUREMENTS

SUPPLEMENTAL WATER-LEVEL MEASUREMENTS

All data are depth to water surface, in feet, below land surface.

Well	Date:	<u>04/22/75</u>	<u>10/22/75</u>	<u>11/21/75</u>	<u>04/05/77</u>
182					2.20
187					3.15
188				7.84	2.38
189				4.86	3.28
190					5.42
192					1.30
410					4.48
A-1		0.48	0.49		
A-2		0.56	0.78		
A-3		0.72	0.69		
A-4		0.62	0.57		
A-5		1.35	1.34		
A-6		2.02	1.85		
A-7		2.70	2.84		
A-8		0.84	0.65		
A-9		0.82	0.98		
A-10		1.94	2.12		
A-12		2.05	2.05		
A-13		2.73	2.88		
A-14		+0.05	+0.05		
A-15		1.98	1.96		
A-16		3.02	3.16		
A-17		2.14	3.69		
A-18		0.92	0.81		
A-19		1.26	1.55		
A-20		2.11	2.20		
A-21		1.90	1.92		
A-22		1.79	1.93		
A-23		1.61	1.72		
A-25		0.87	1.02		
A-26		1.13	1.27		
A-27		1.47	1.51		
A-28		0.75	0.55		
A-29		0.92	0.79		
A-30		1.45	1.21		
A-31		0.07	+0.24		
A-32		0.81	0.75		
A-33		1.38	1.40		
A-34		1.27	1.23		
A-36		1.43	1.55		
A-37		2.68	2.36		

	<u>Date</u>	<u>Depth to water below land surface</u>
<u>Well 188</u>	2-06-78	4.48
	2-13-78	4.84
	2-22-78	4.91
	2-27-78	5.09
	3-06-78	3.46
	3-13-78	2.91
	3-20-78	3.89
	3-27-78	3.67
	4-03-78	4.82
	4-10-78	5.95
	4-17-78	6.13
	4-24-78	4.66
	5-01-78	4.03
	5-10-78	3.10
	5-15-78	3.29
	5-22-78	4.80
	5-30-78	5.91

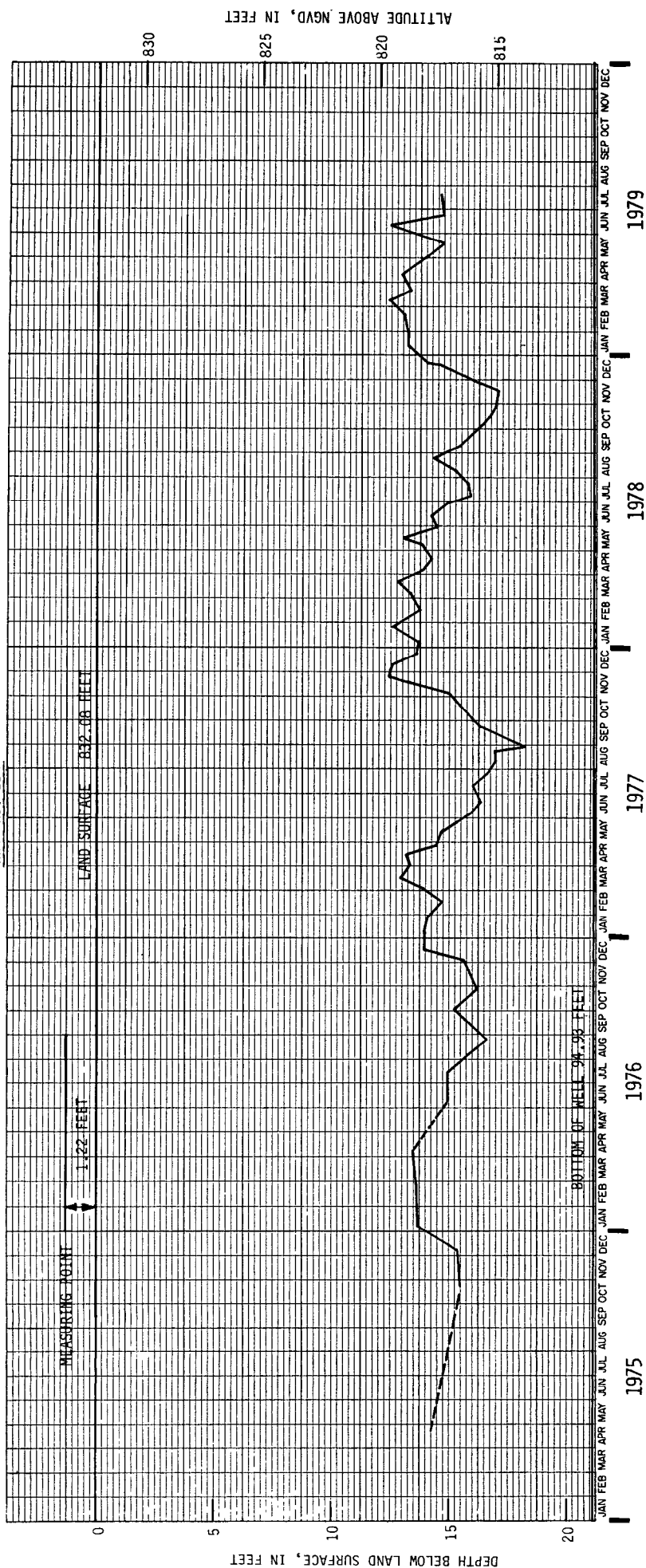
Miscellaneous

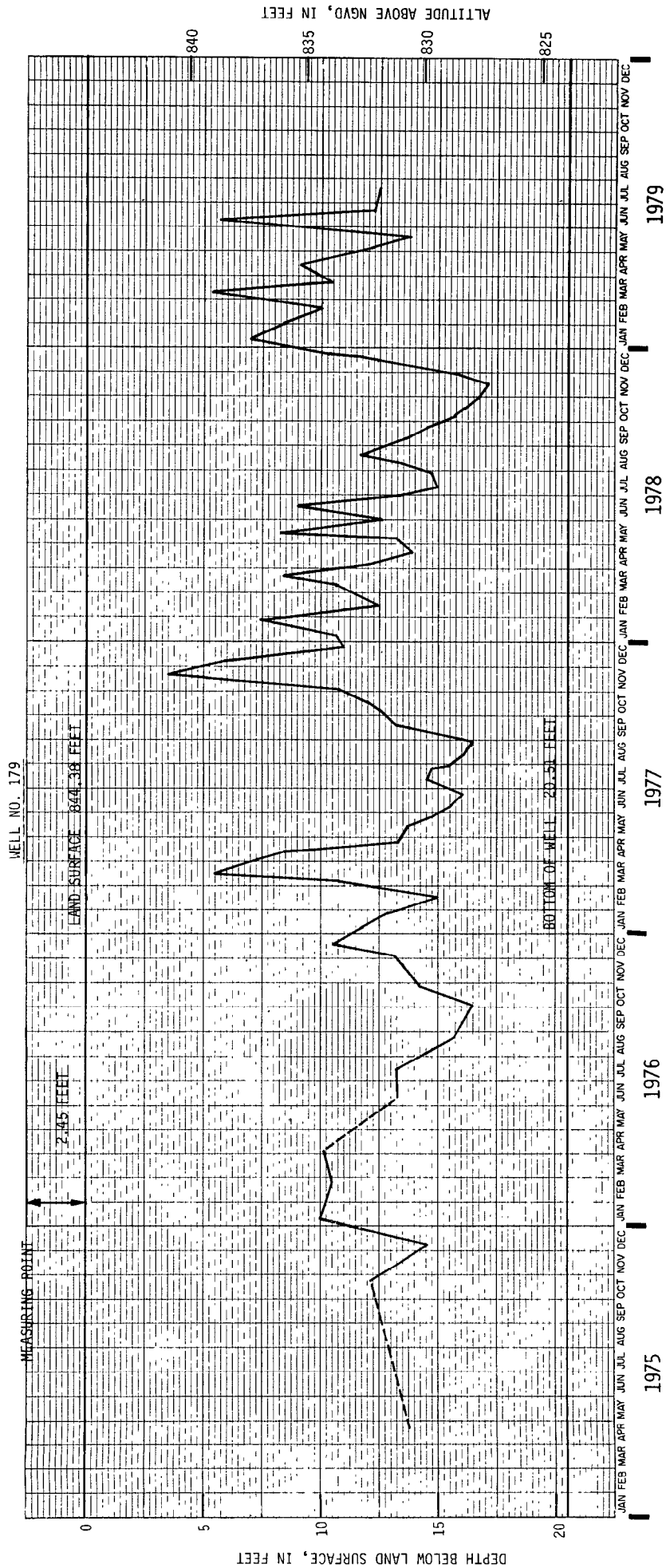
Well 183: Oil frequently noted on tape during measurements from April through November.

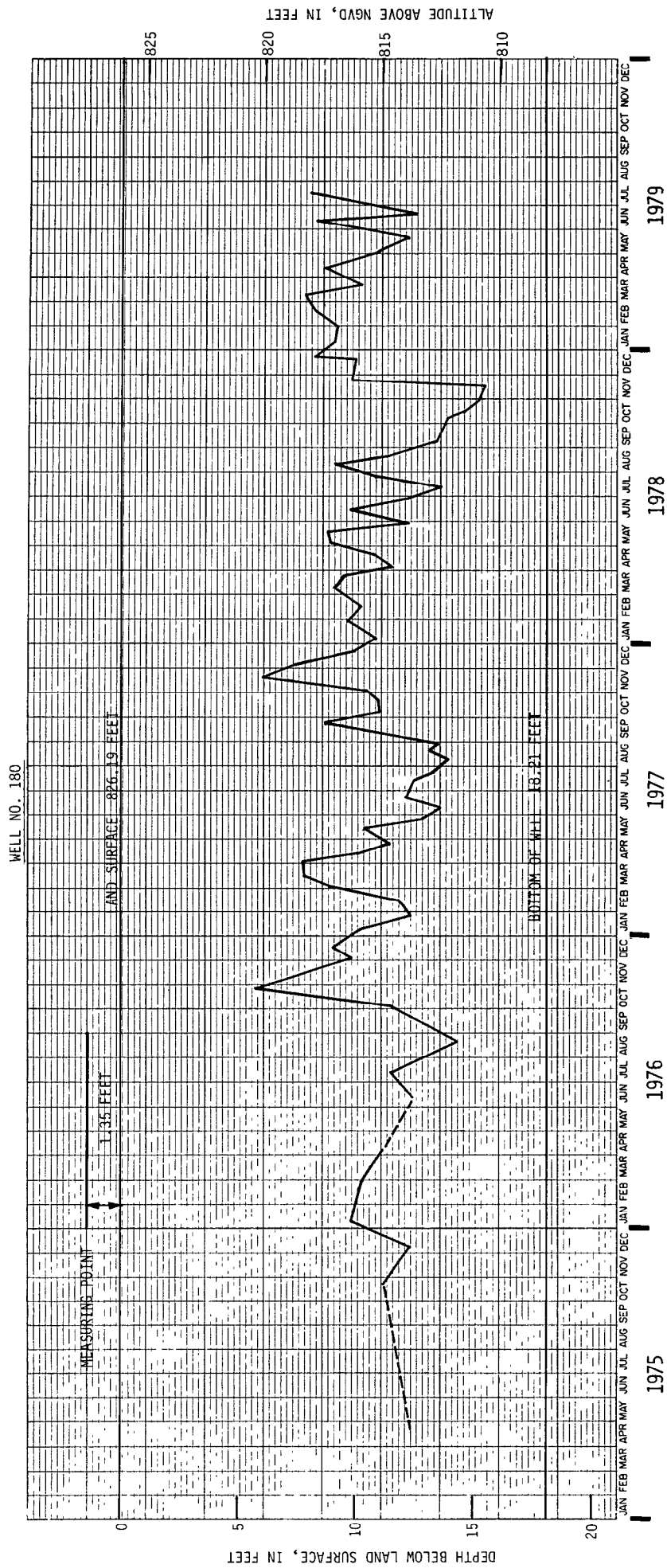
Well 186: Receives water from surface drainage.

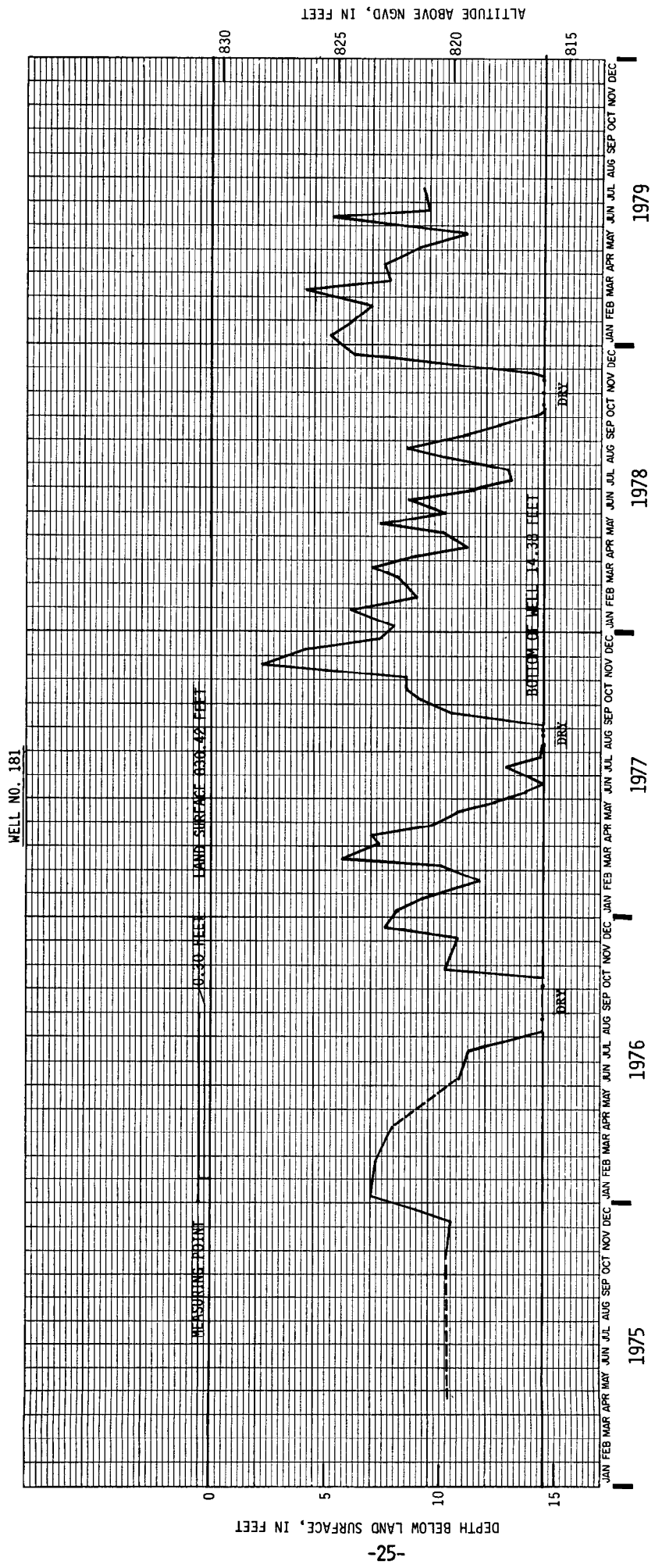
PART 4. -- HYDROGRAPHS

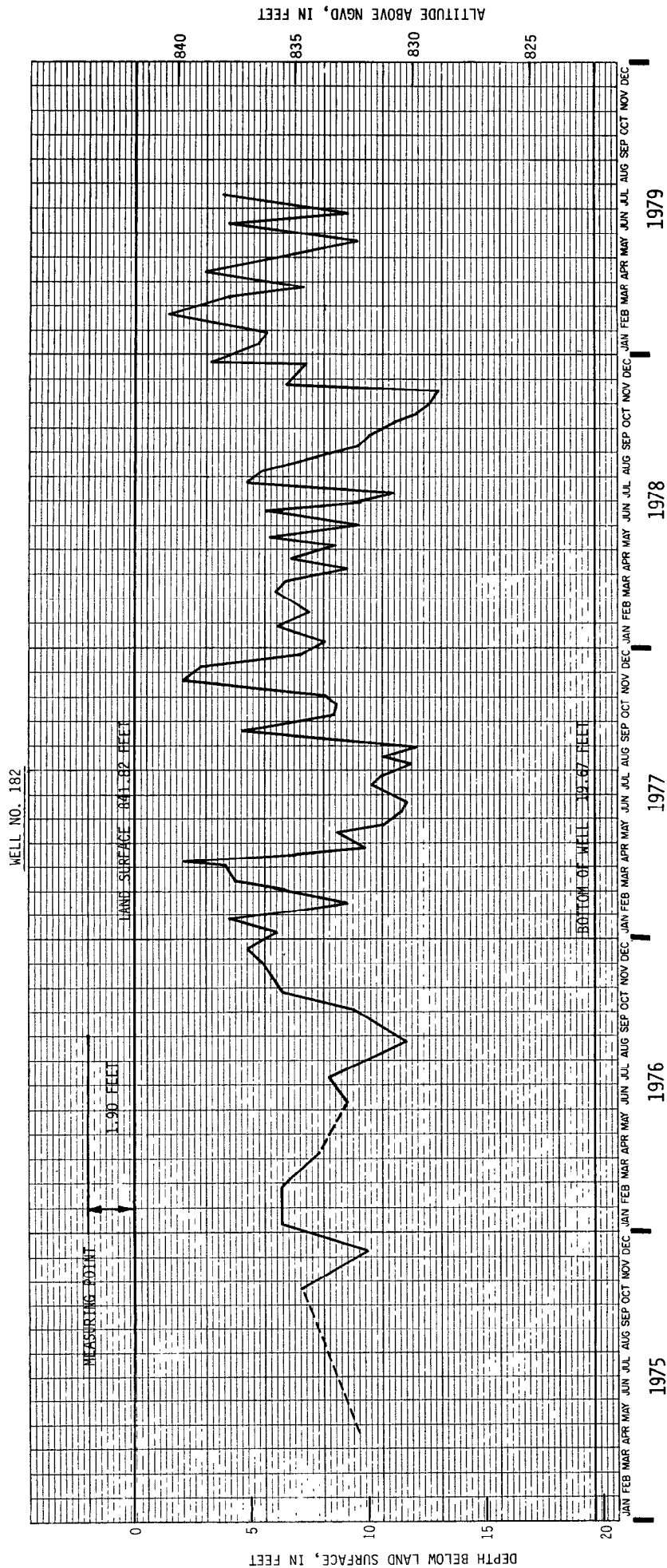
WELL NO. 112



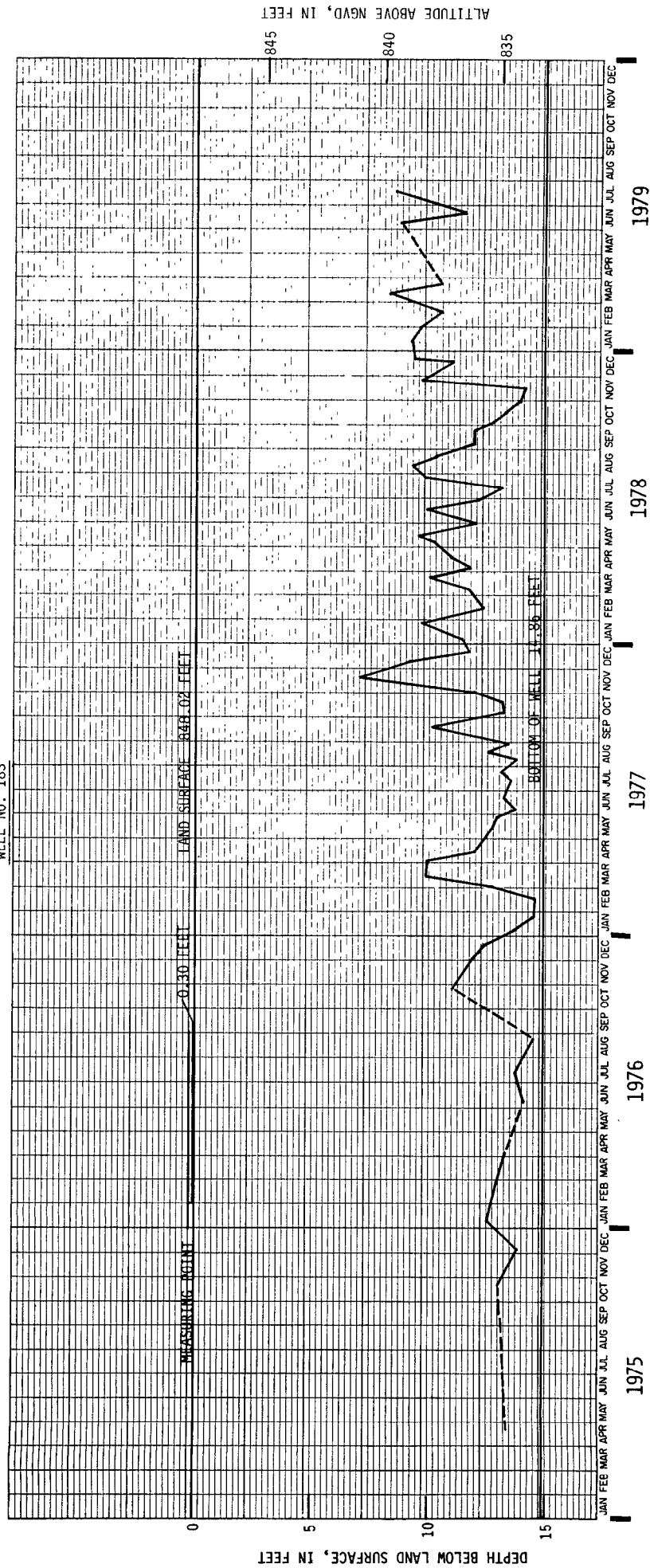


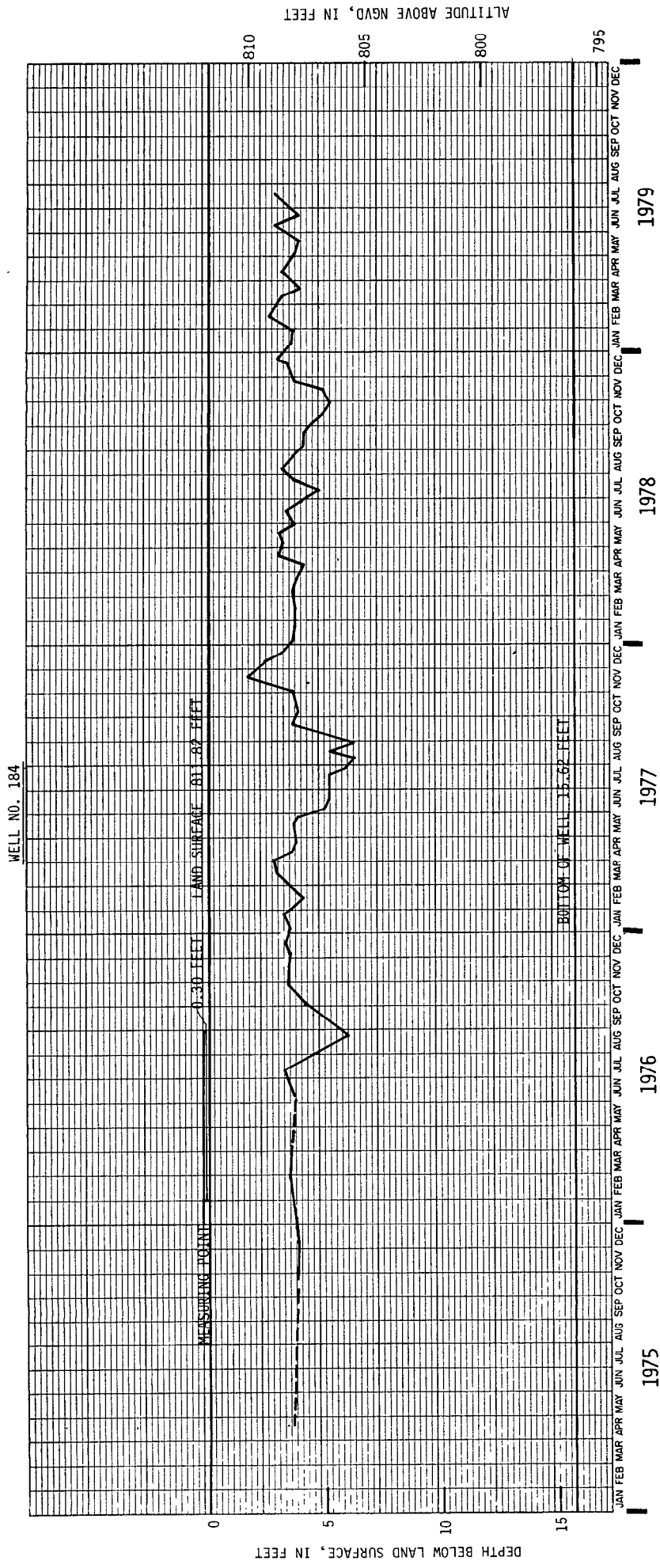




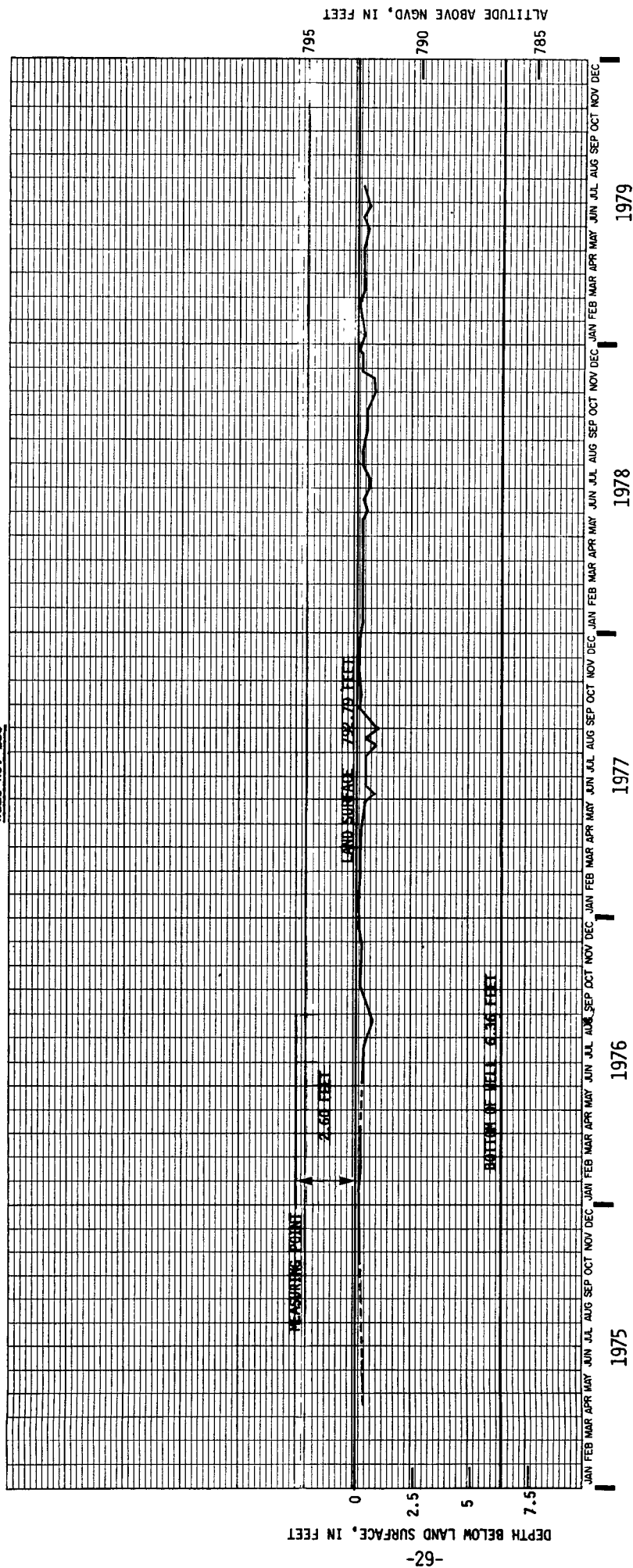


WELL NO. 183

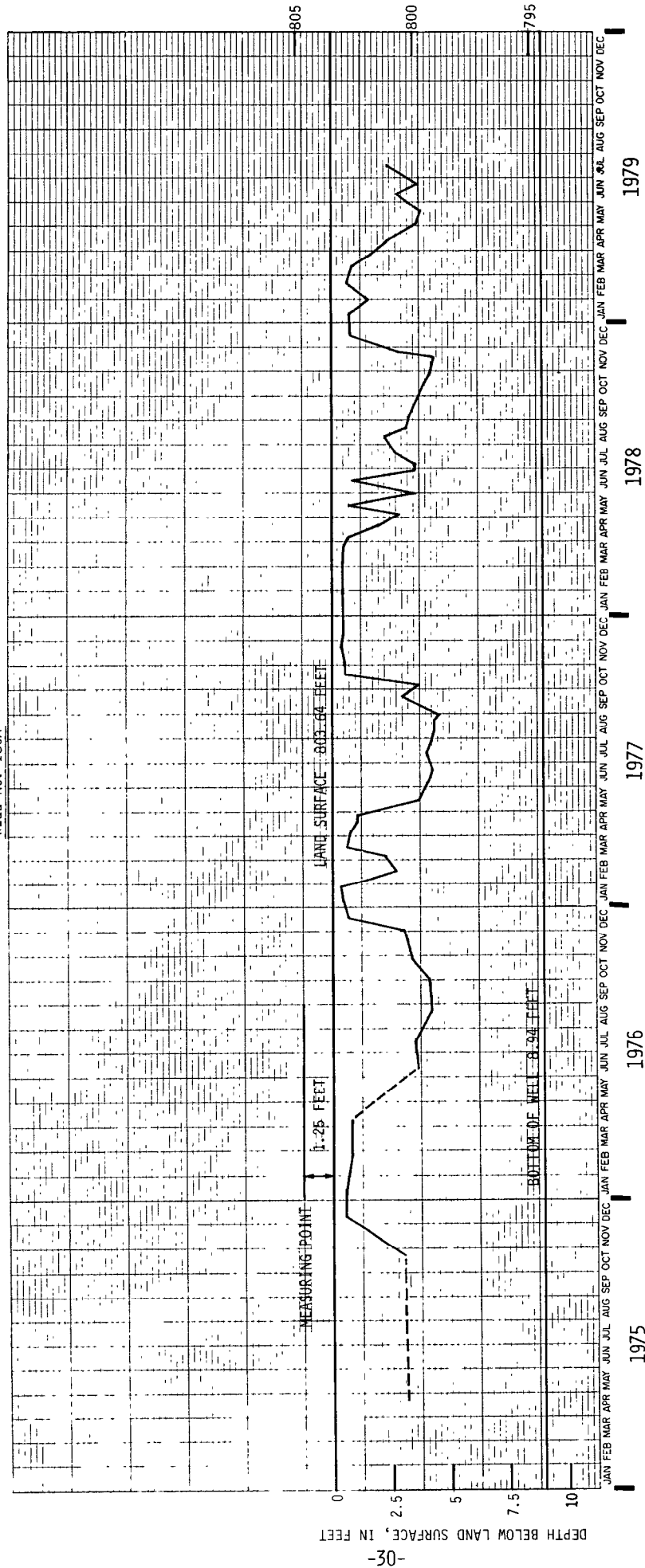




WELL NO. 186

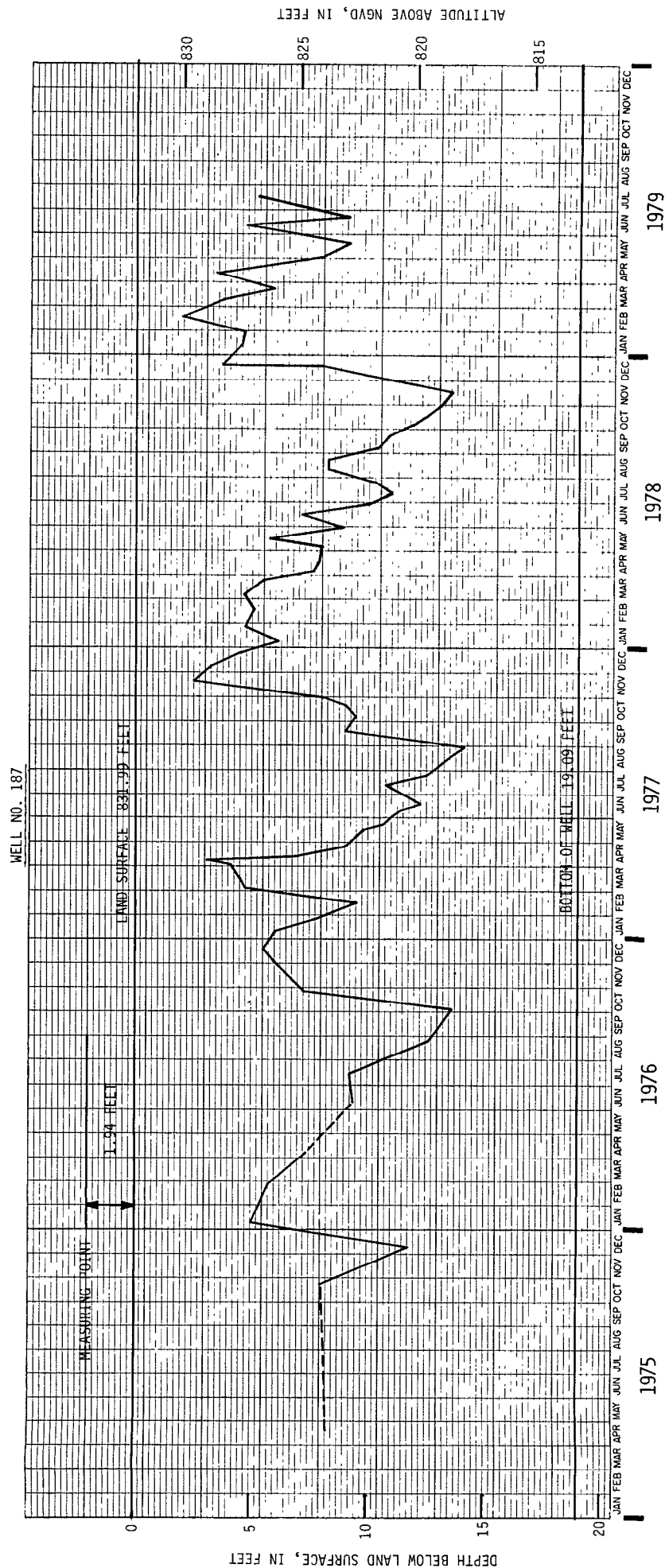


WELL NO. 186A

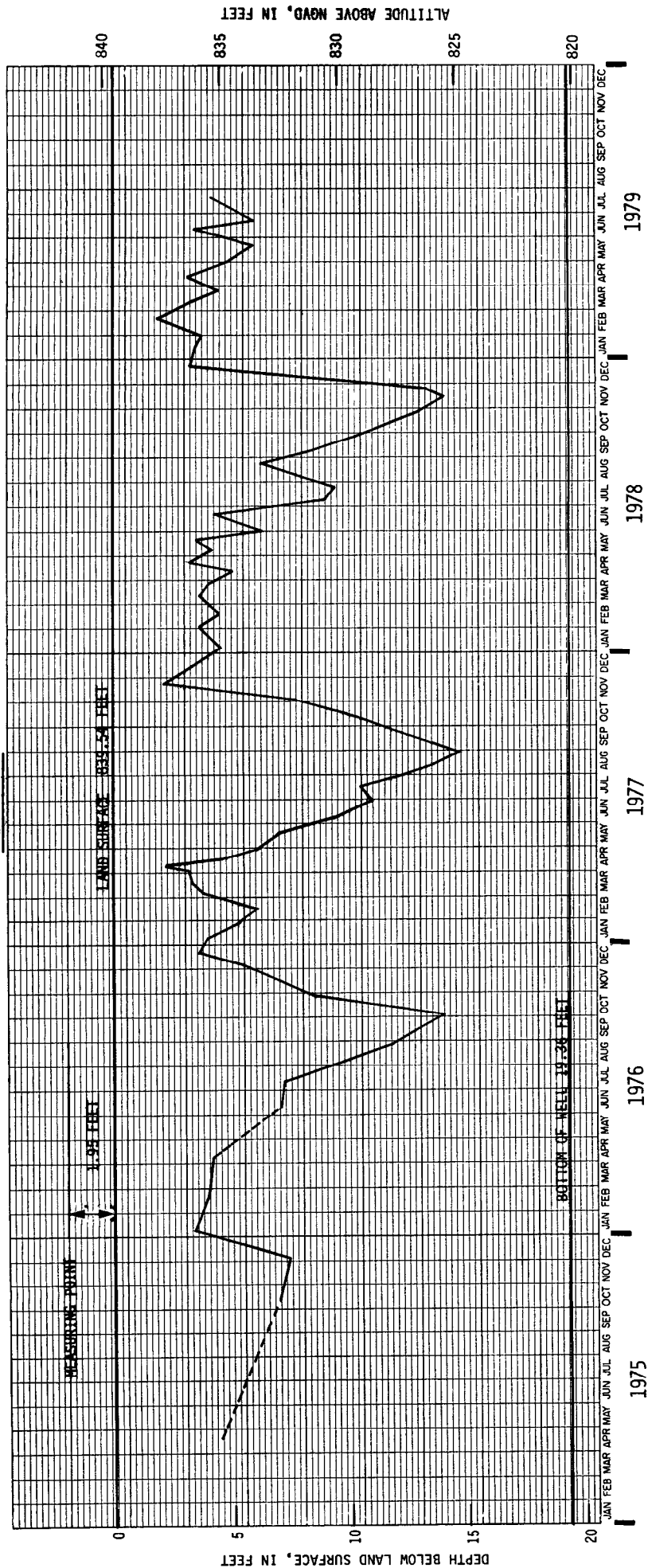


DEPTH BELOW LAND SURFACE, IN FEET

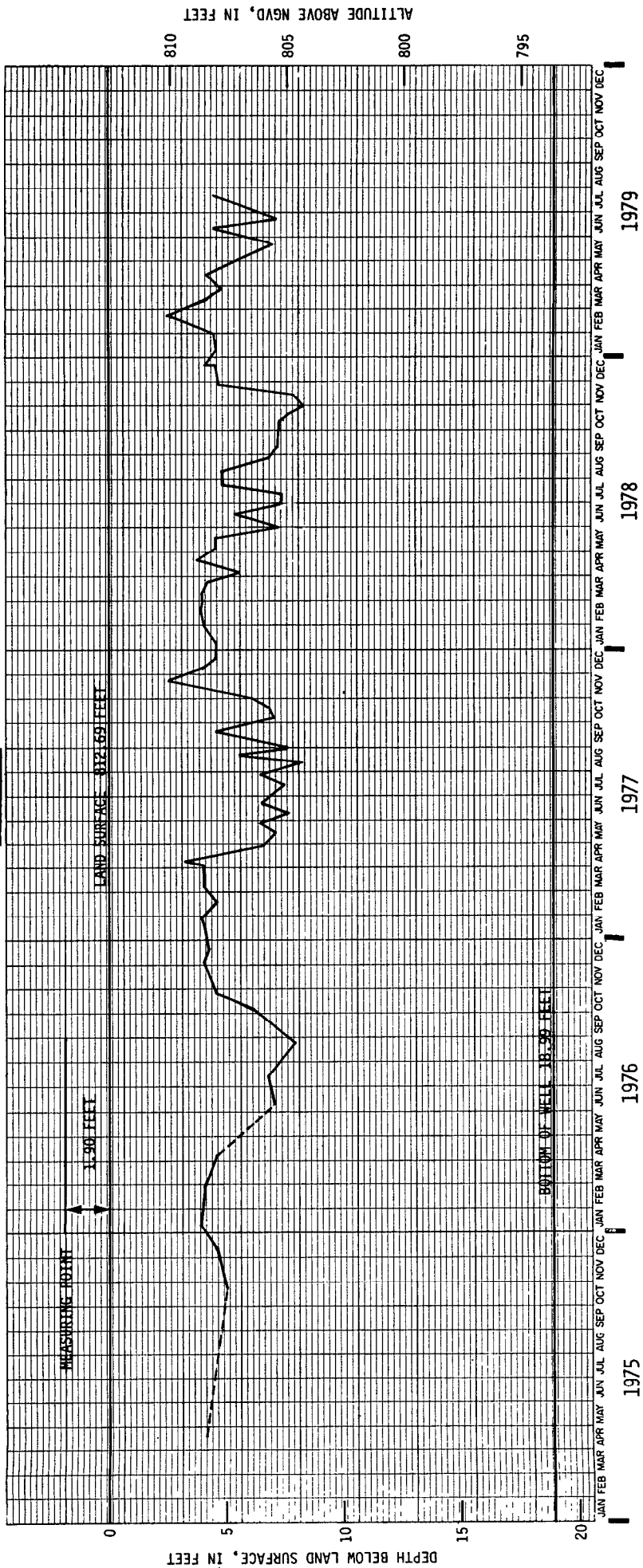
ALTITUDE ABOVE NGVD, IN FEET



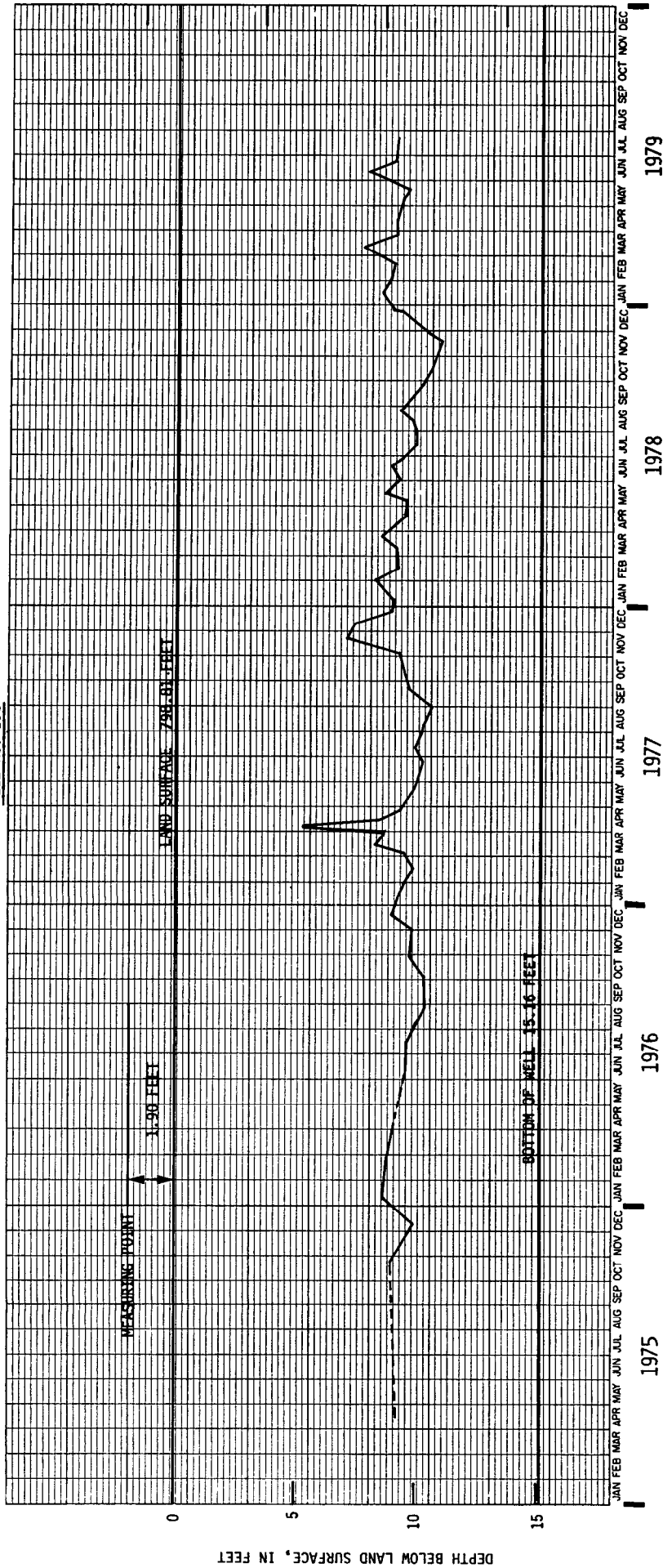
WELL NO. 188



WELL NO. 189



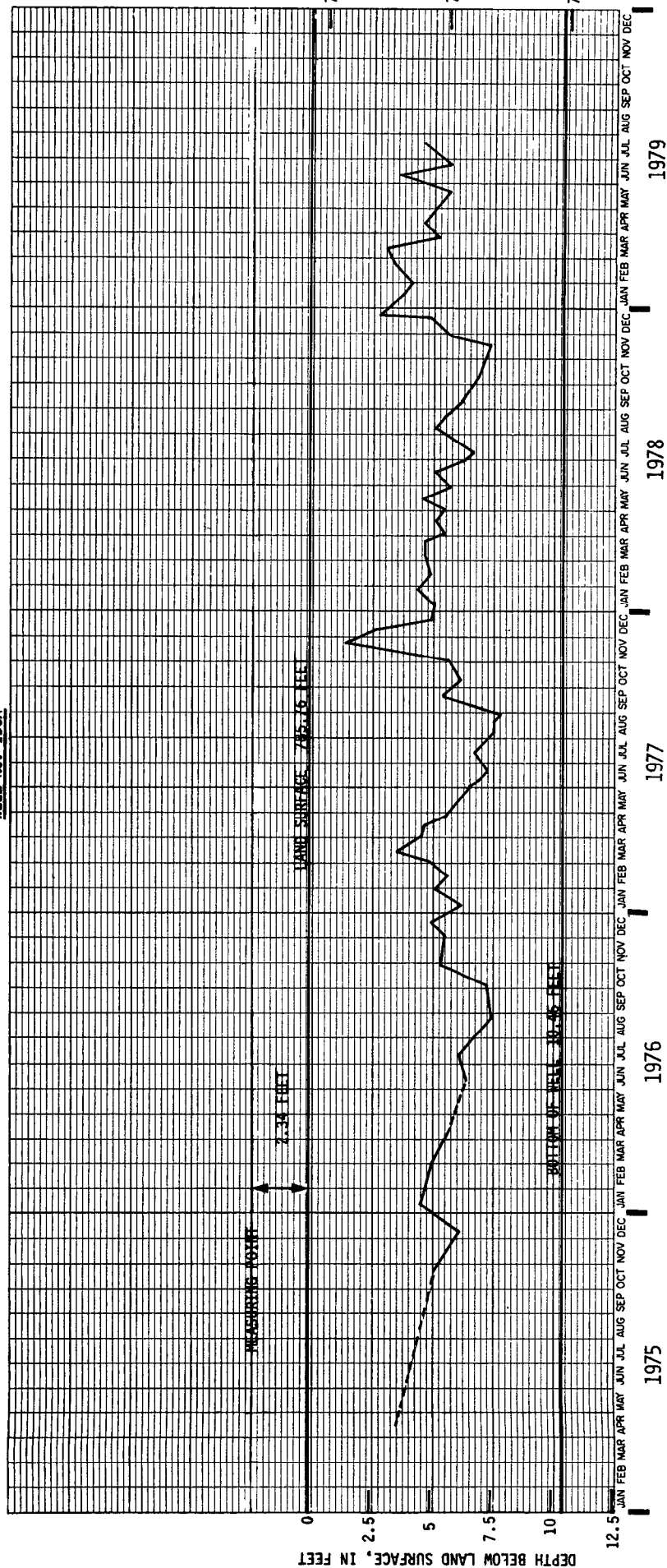
WELL NO. 190

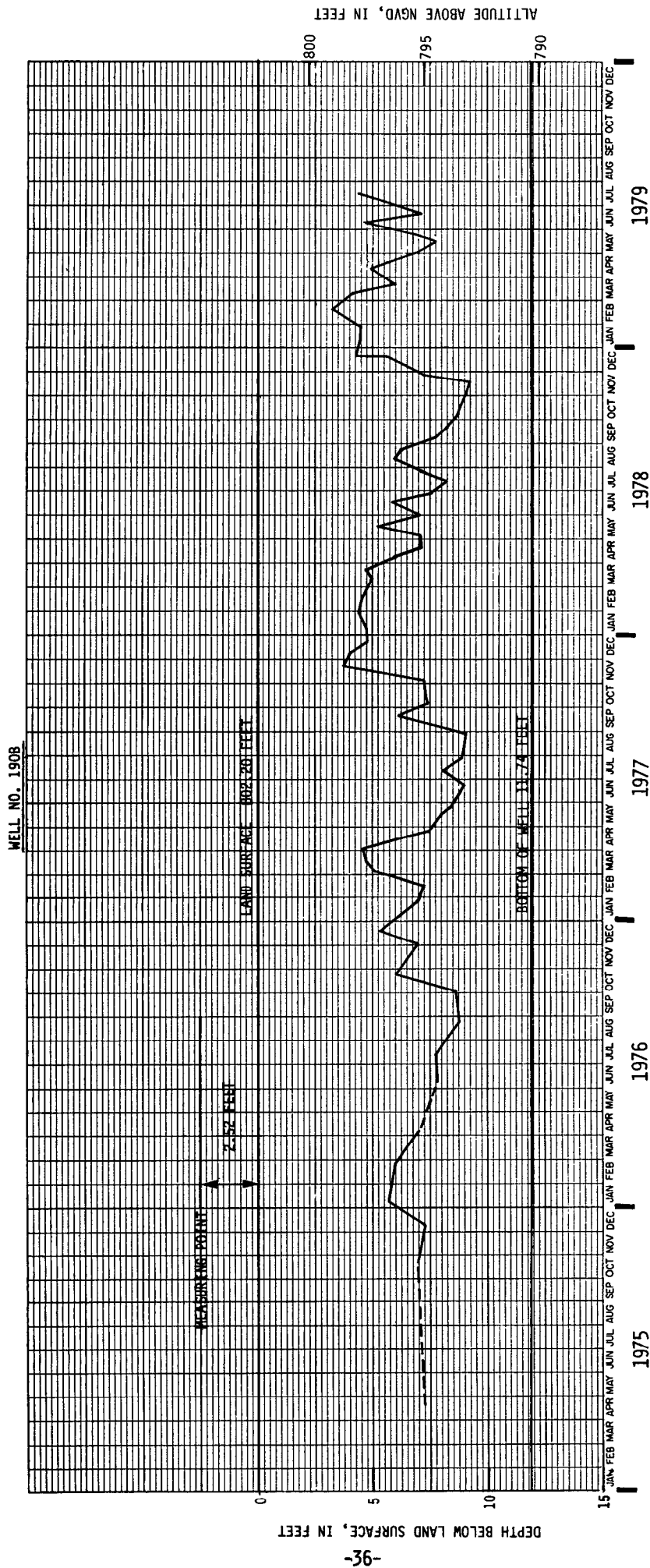


DEPTH BELOW LAND SURFACE, IN FEET

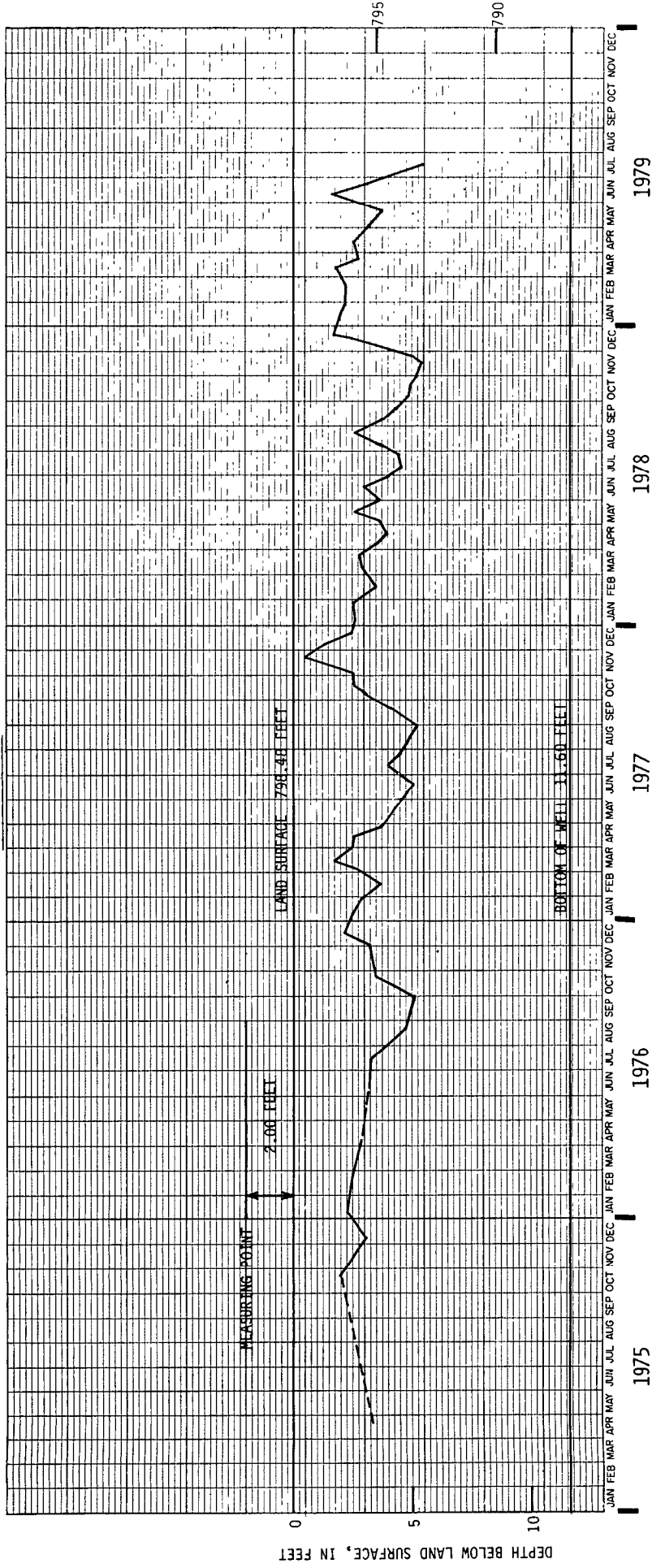
ALTITUDE ABOVE NGVD, IN FEET

WELL NO. 190A





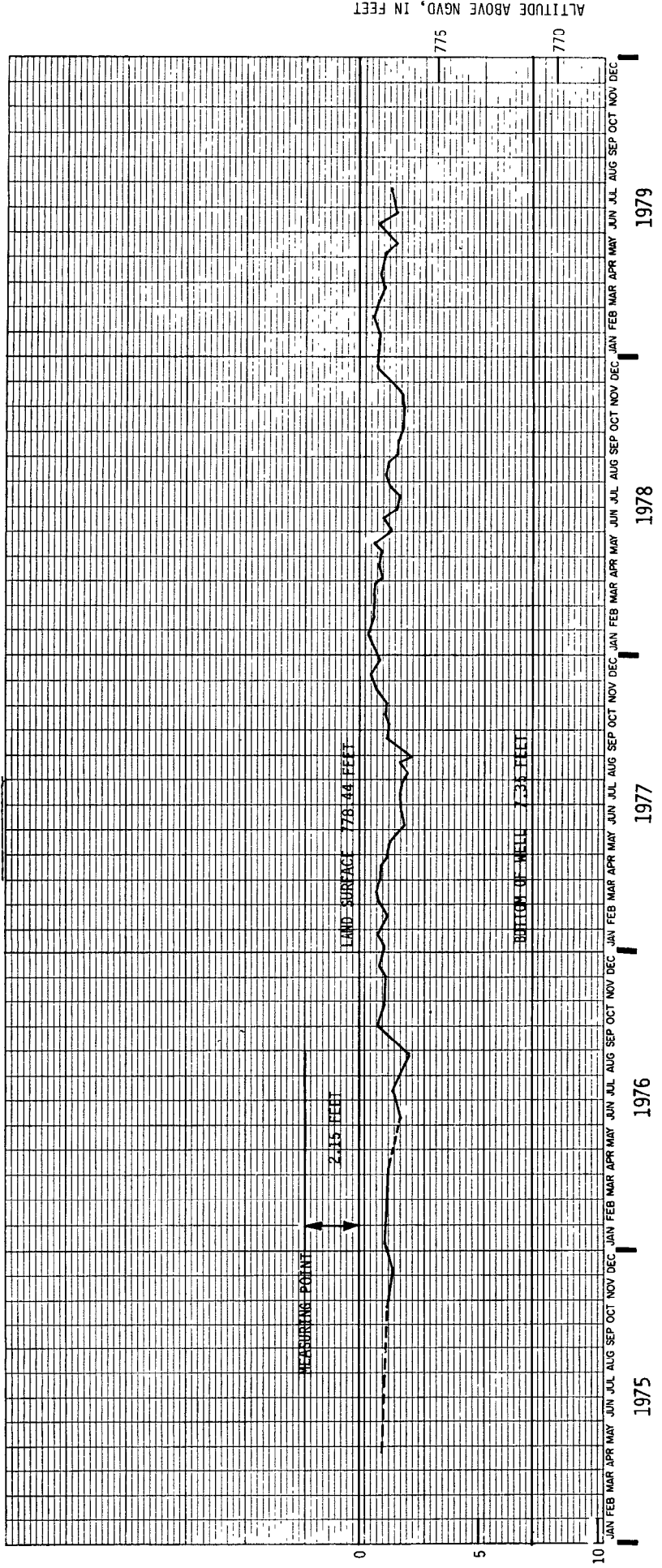
WELL NO. 190C

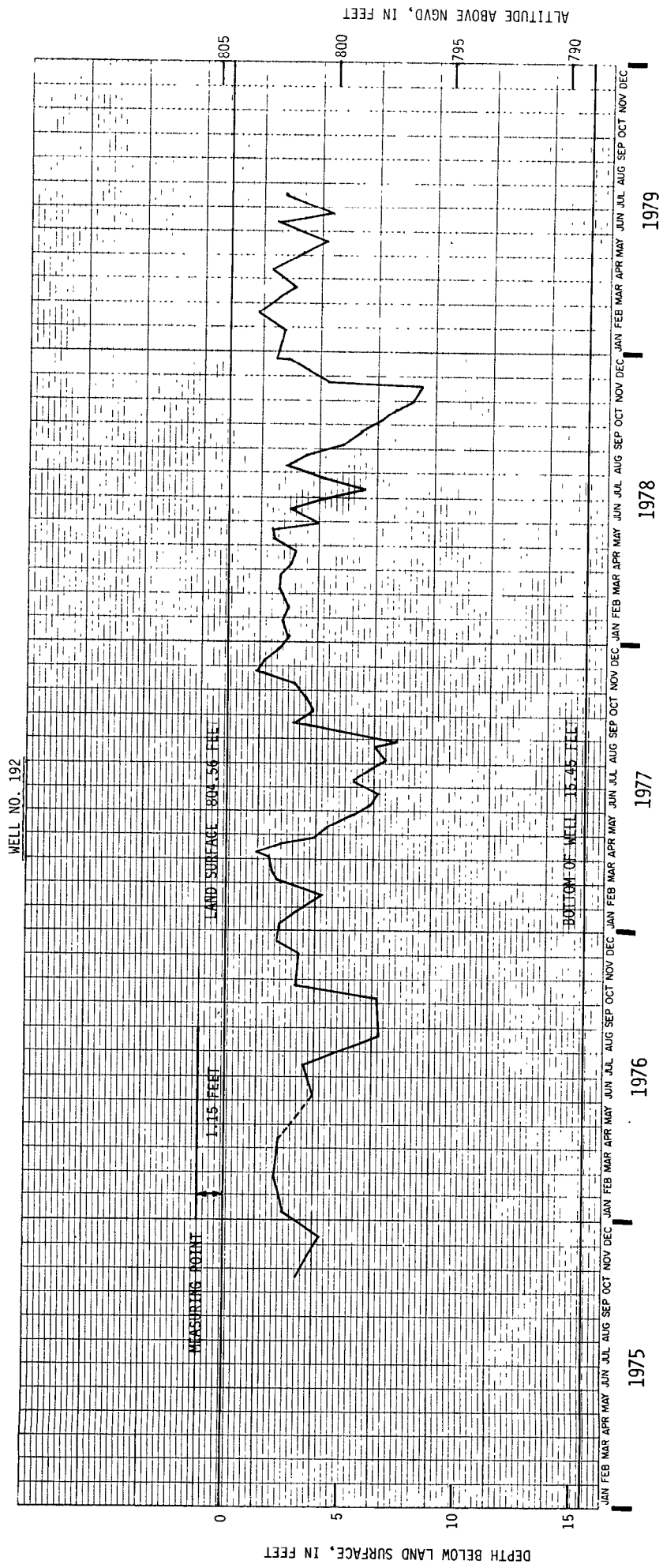


DEPTH BELOW LAND SURFACE, IN FEET

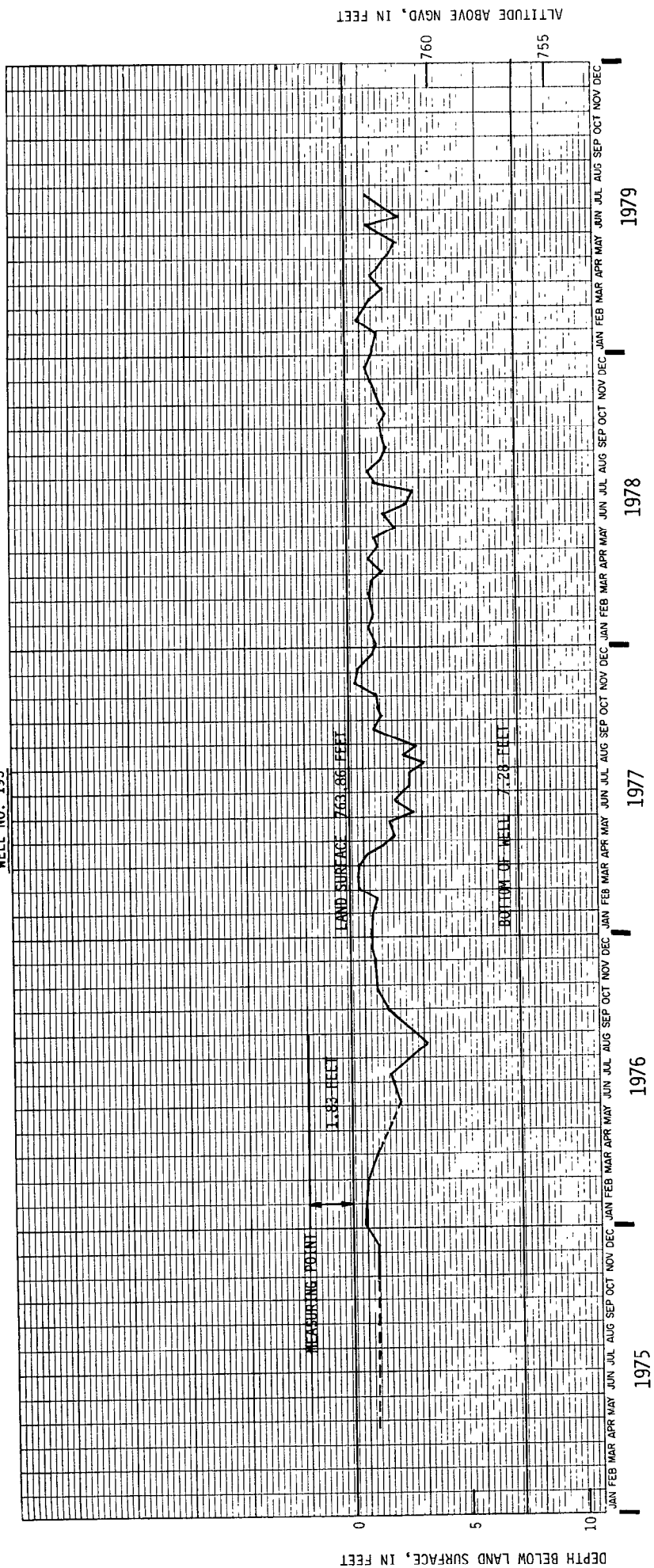
ALTITUDE ABOVE NGVD, IN FEET

WELL NO. 191

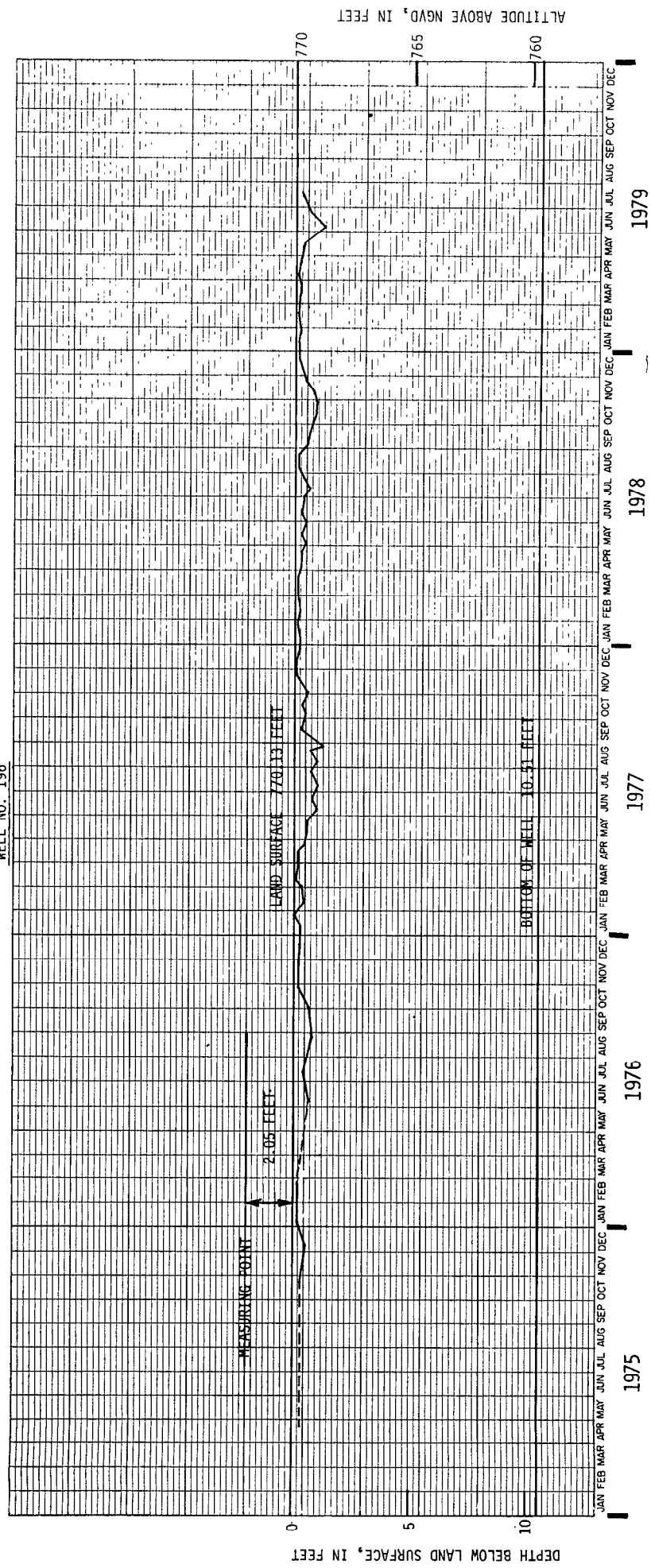


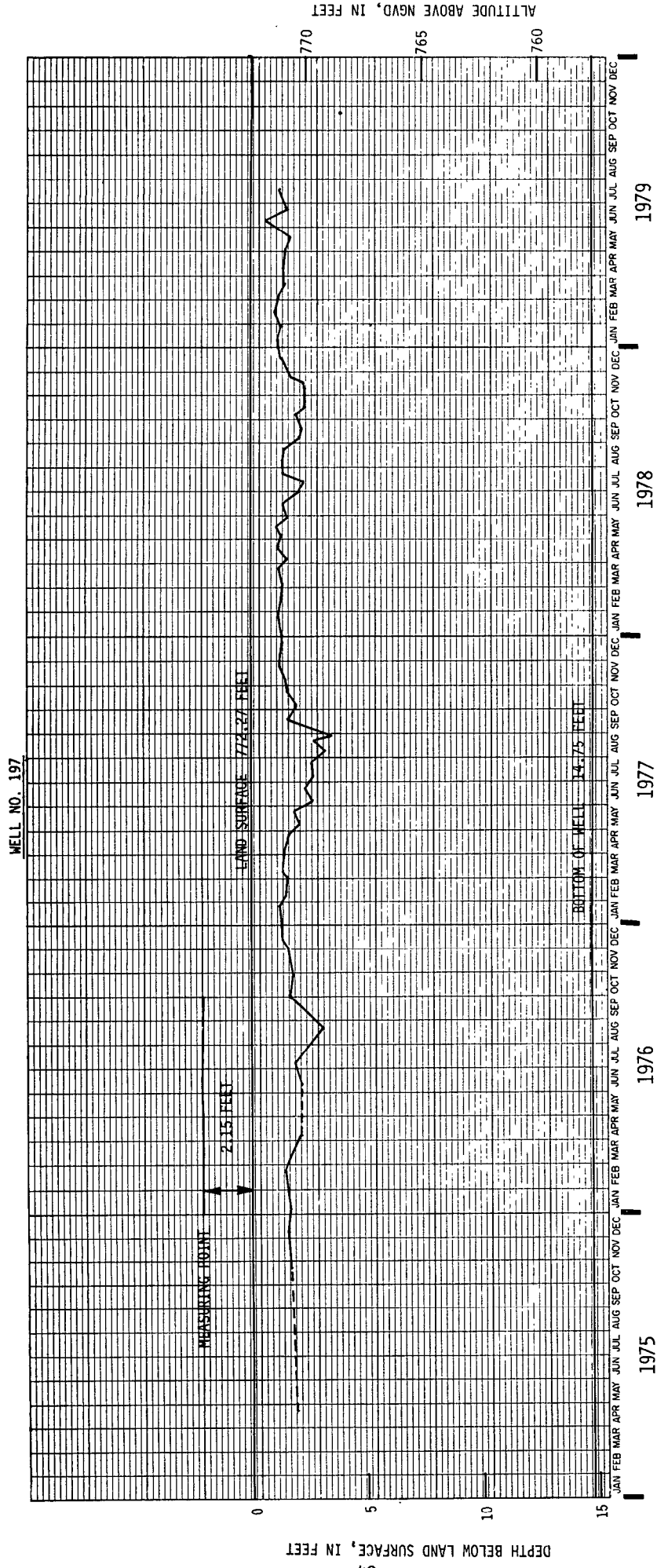


WELL NO. 195



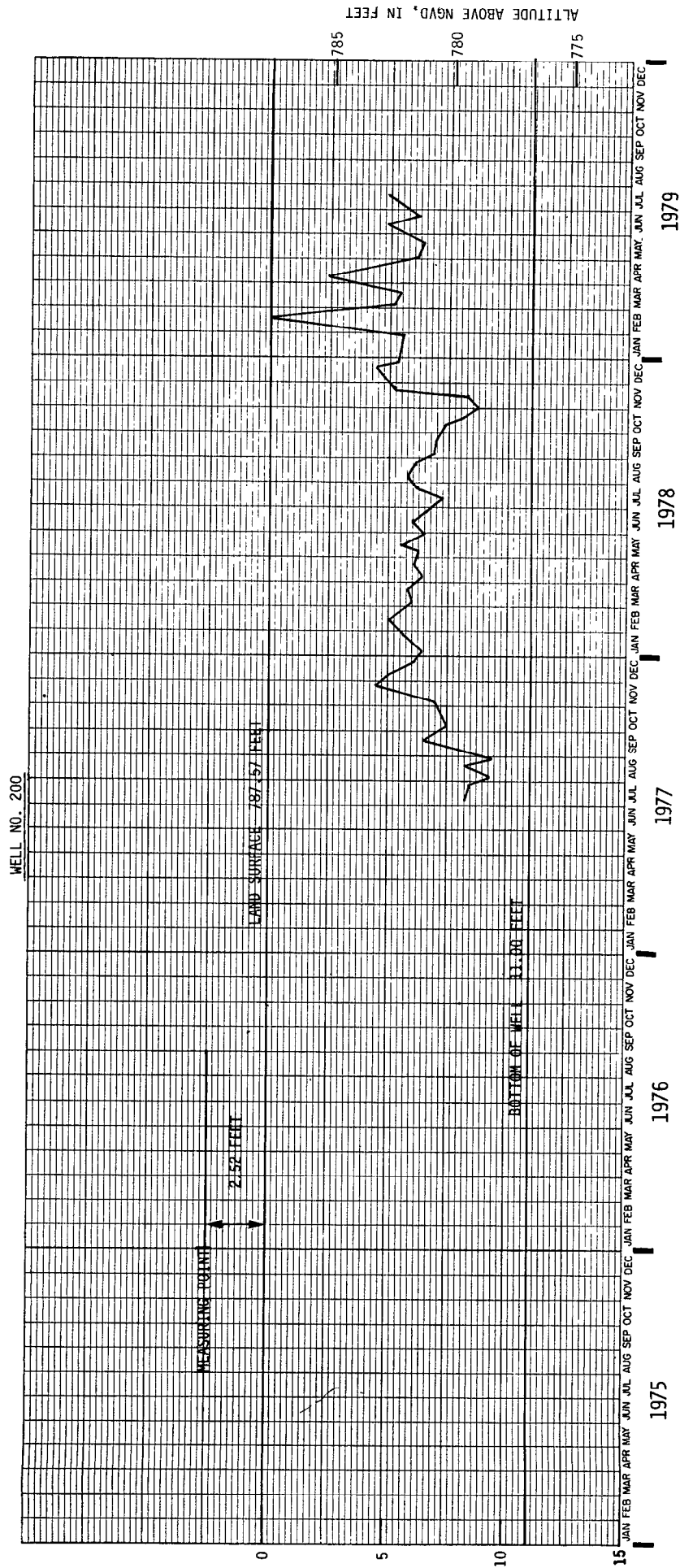
WELL NO. 196

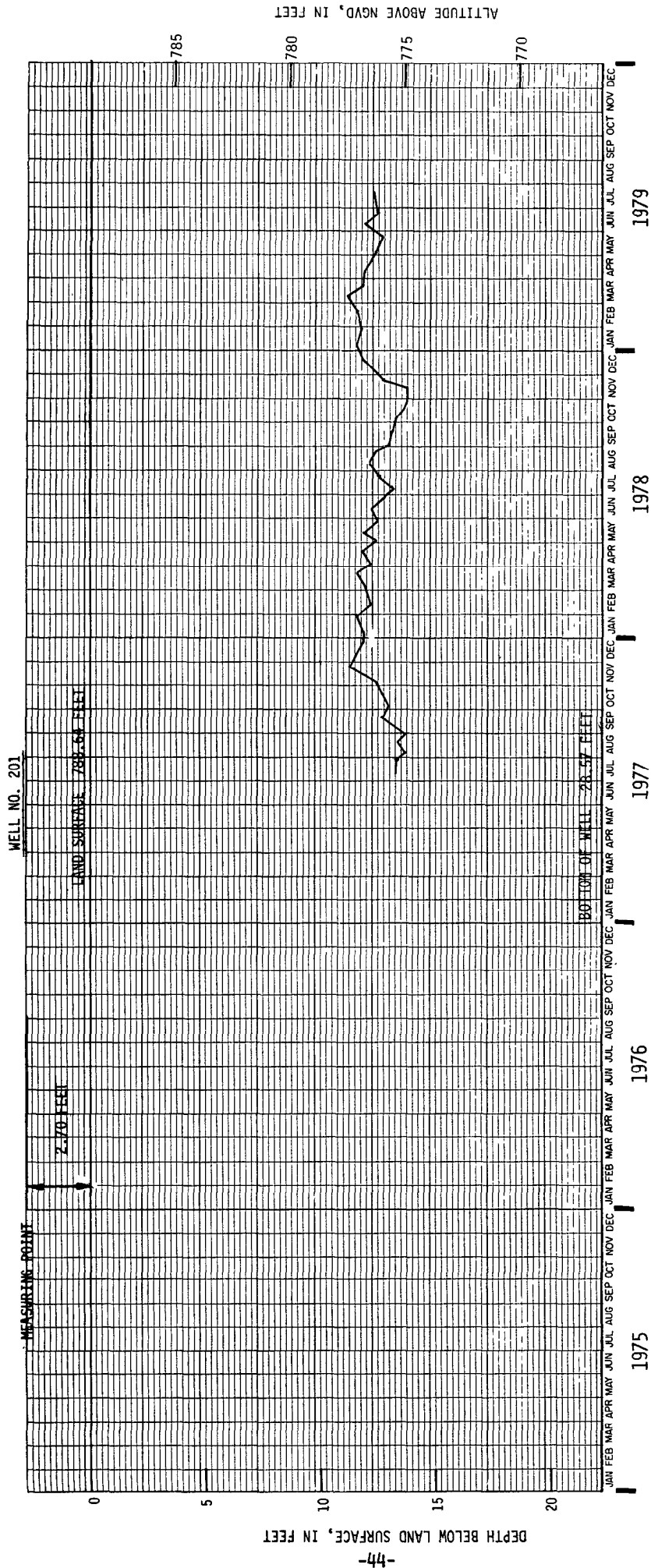


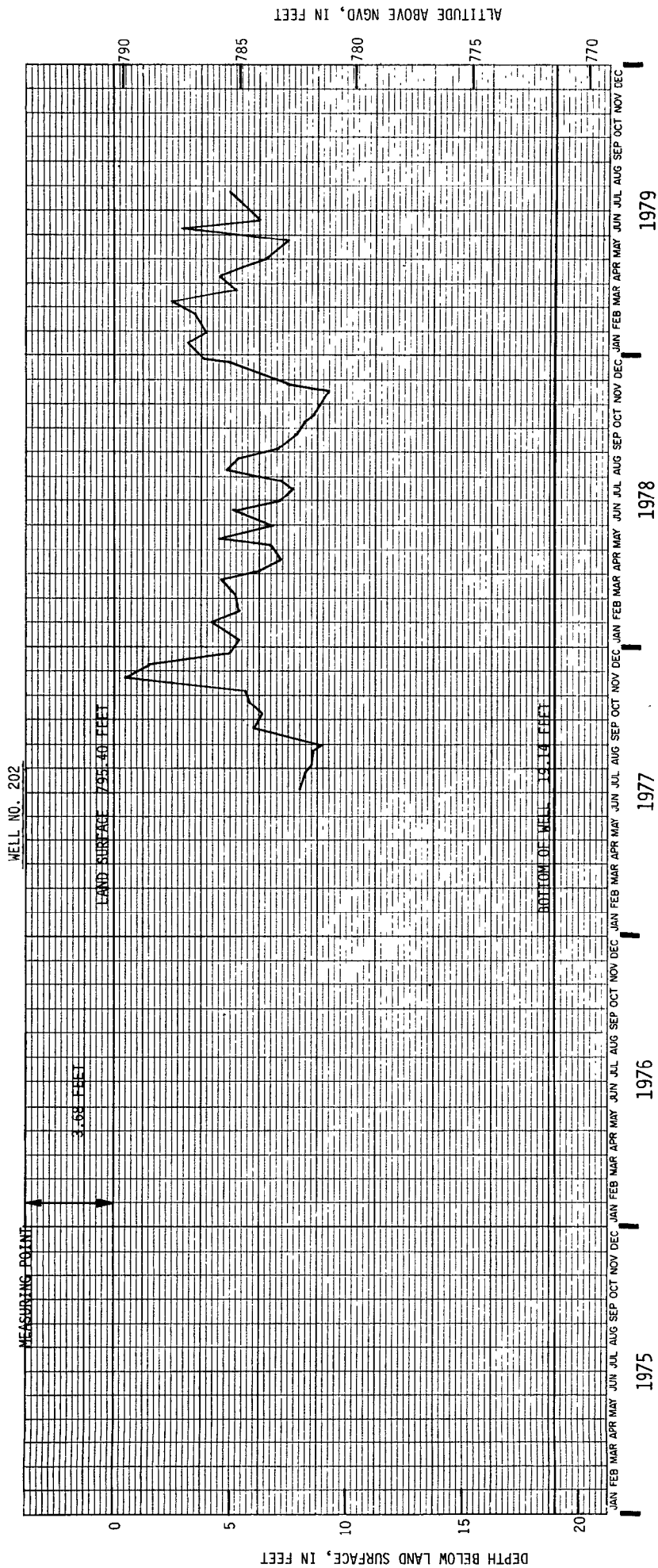


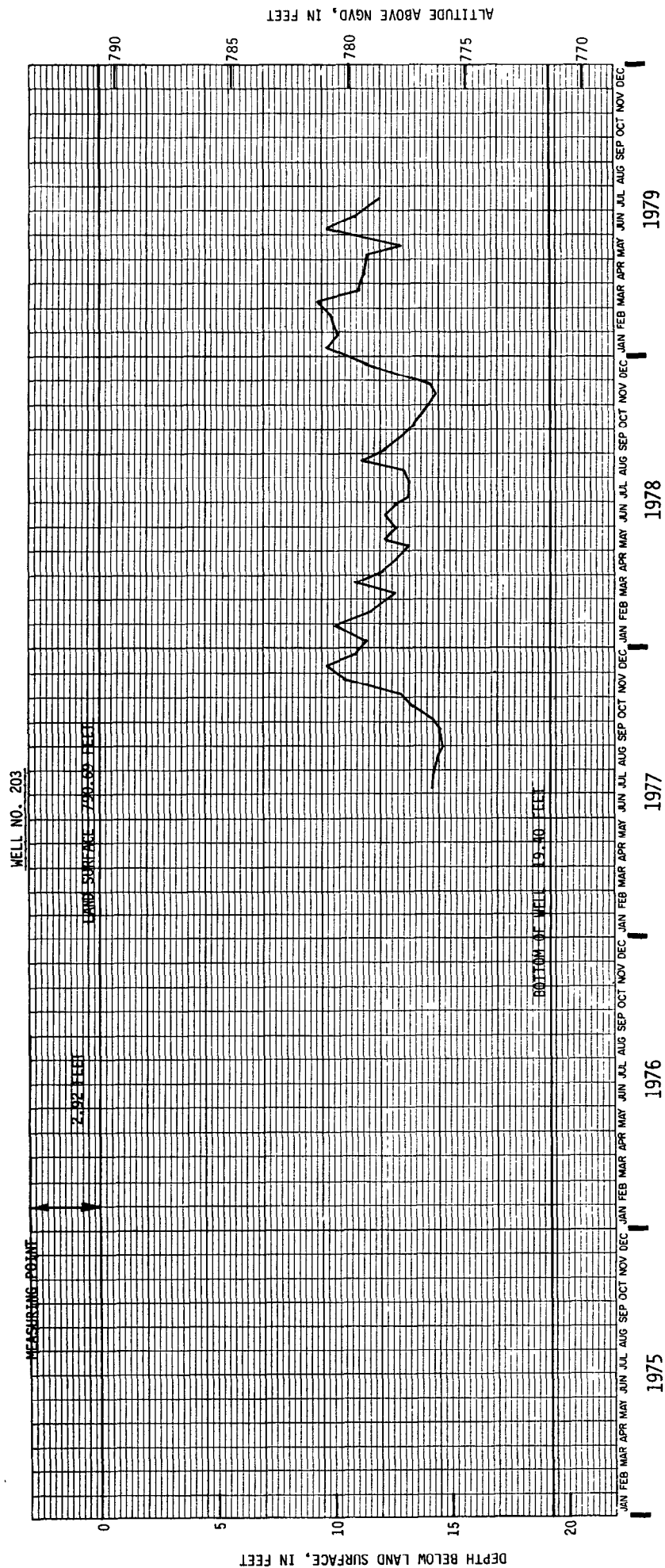
DEPTH BELOW LAND SURFACE, IN FEET

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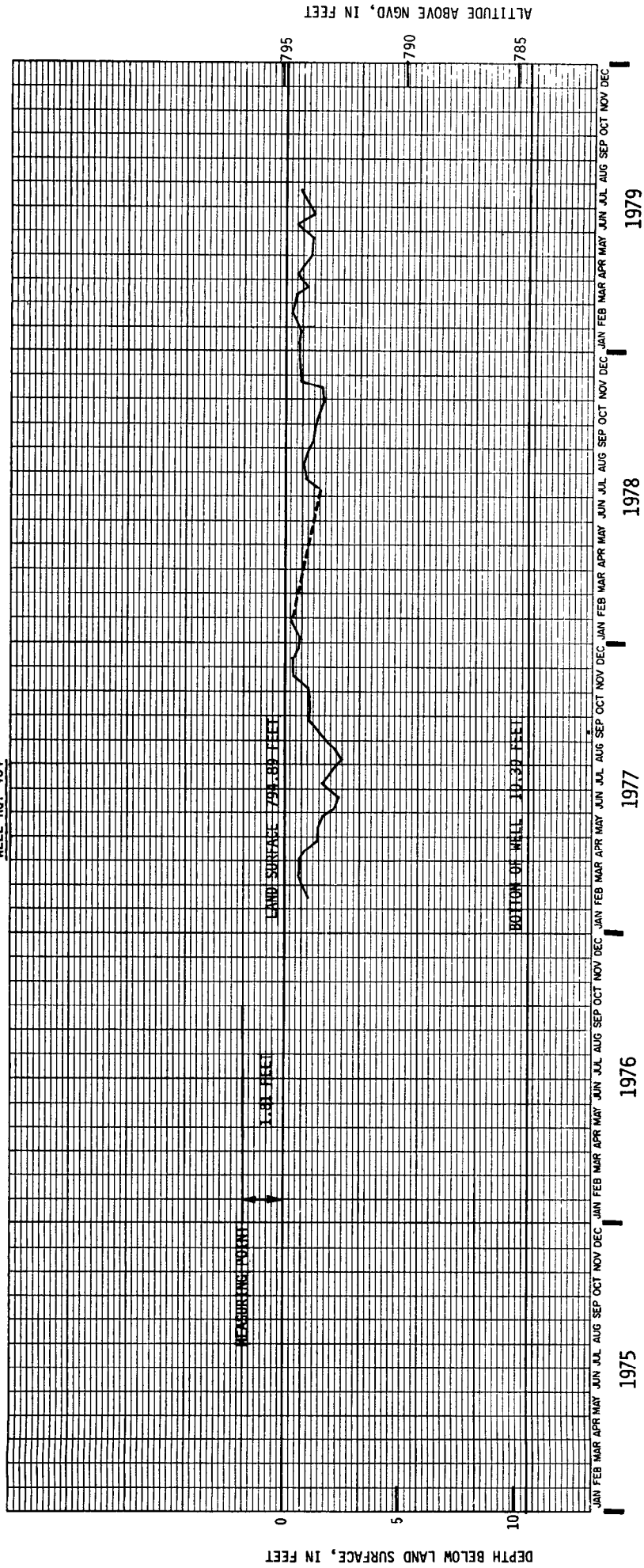




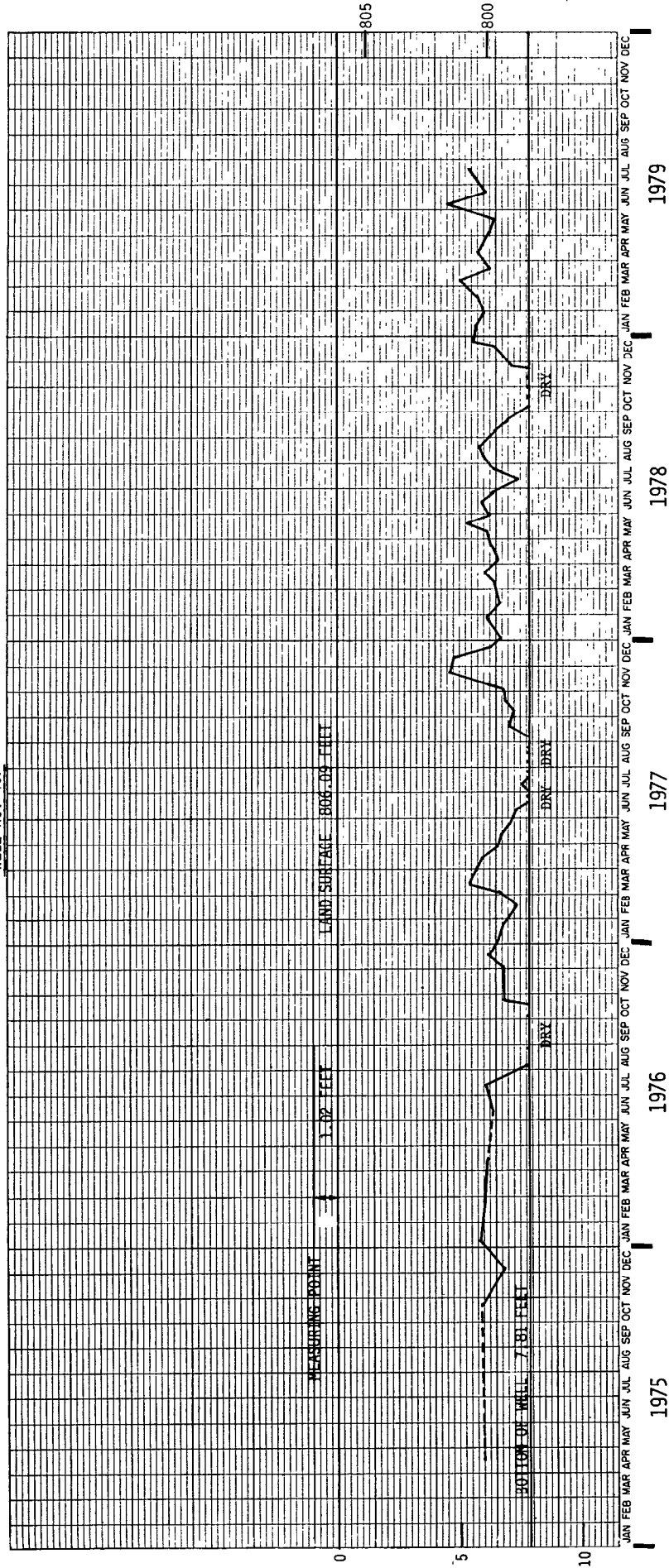


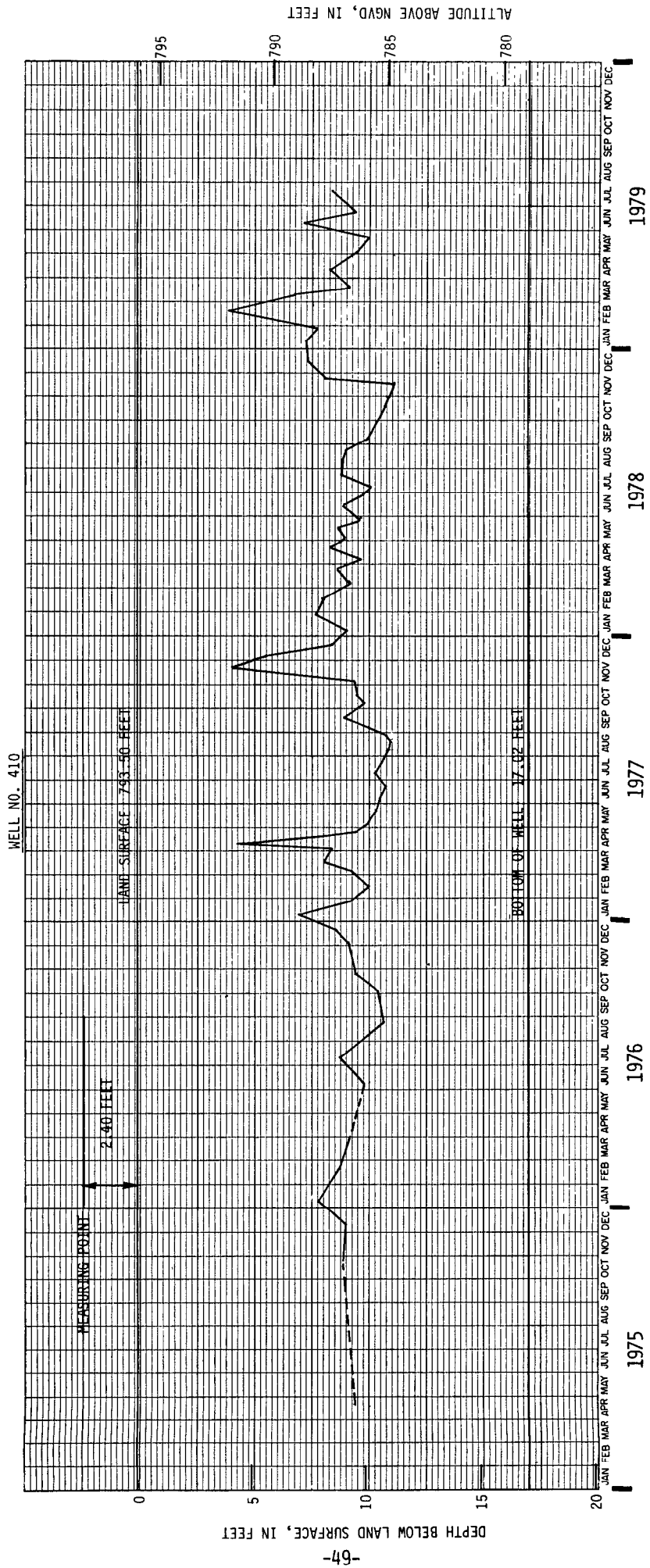


WELL NO. 404



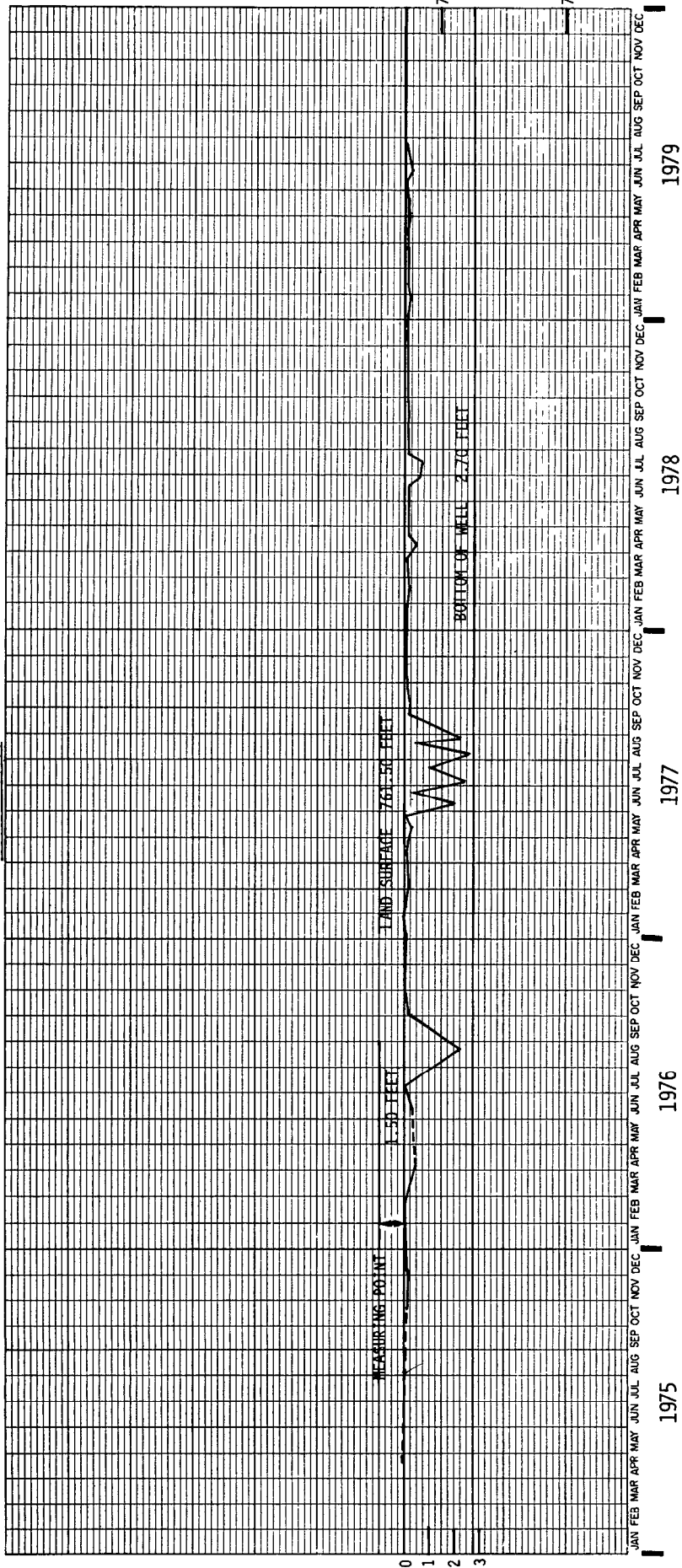
WELL NO. 407

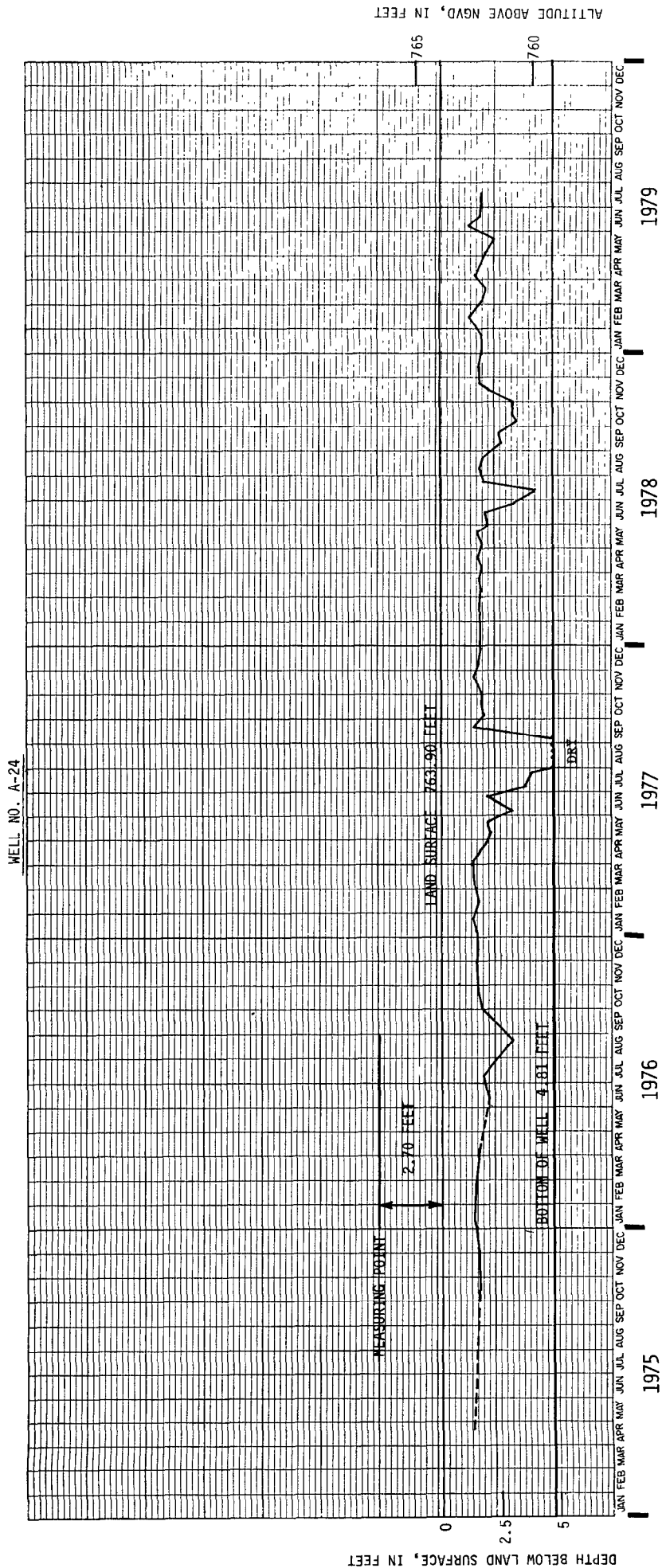




DEPTH BELOW LAND SURFACE, IN FEET

WELL NO. A-11





WELL NO. A-35

